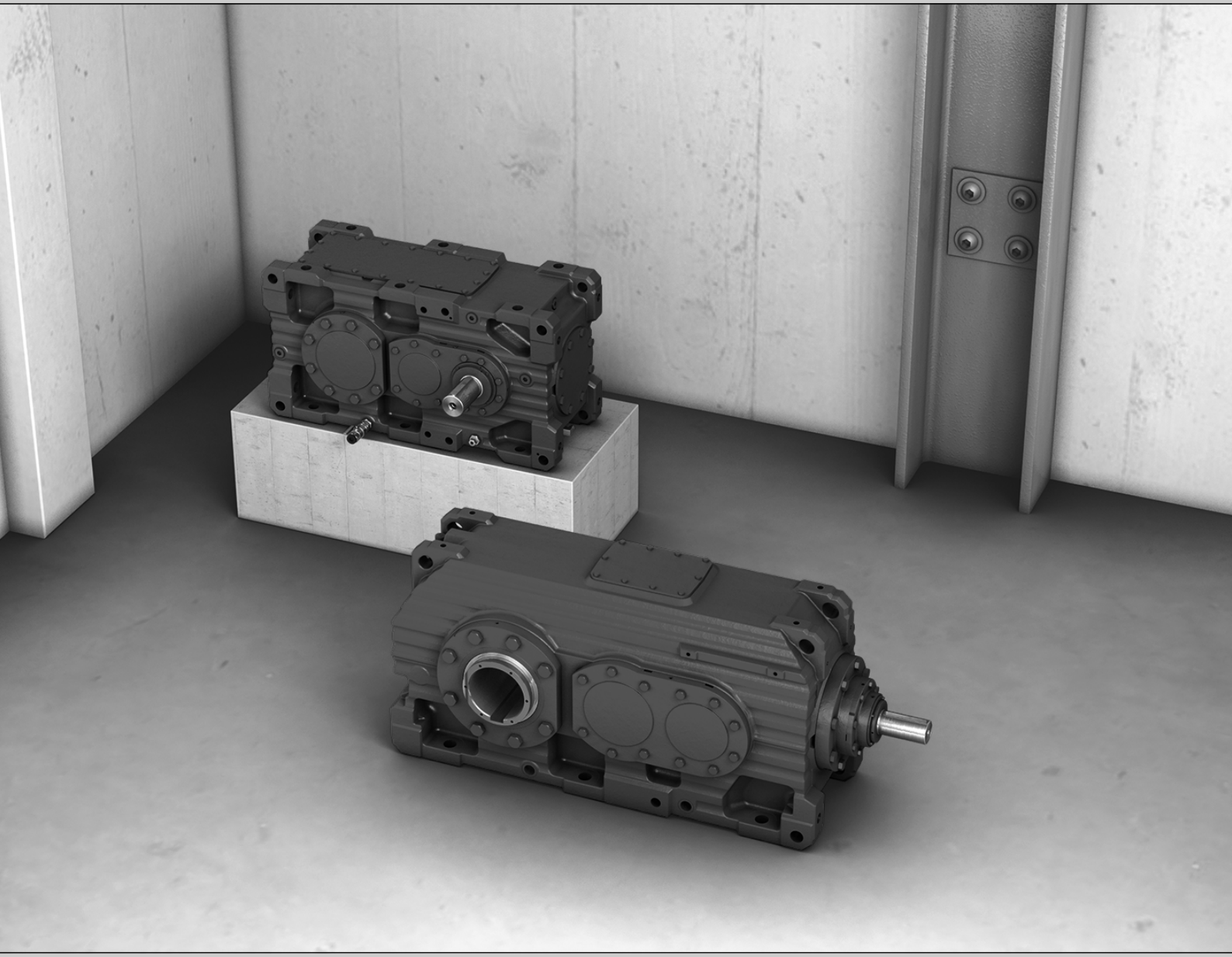
SEW EURODRIVE

Notice de montage et d'exploitation



Réducteurs industriels

Motopompe pour lubrification sous pression /ONP1L

Édition 05/2019

23055324/FR

Sommaire

23055324/FR – 05/2019

1 Motopompe pour lubrification sous pression

1.1 Structure et fonctionnement

1.1.1 Structure

Une motopompe est par exemple utilisée lorsque la vitesse de la pompe attelée est ≤ 400 tr/min ou en cas de fonctionnement avec variateur de vitesse là où l'utilisation d'une pompe attelée n'est possible que sous certaines conditions.

La motopompe est montée à l'extérieur du réducteur ; son fonctionnement ne dépend donc pas de la vitesse du réducteur.

Pour les tailles de réducteur X140 à X320, la pompe est dotée d'un limiteur de pression intégré.

REMARQUE

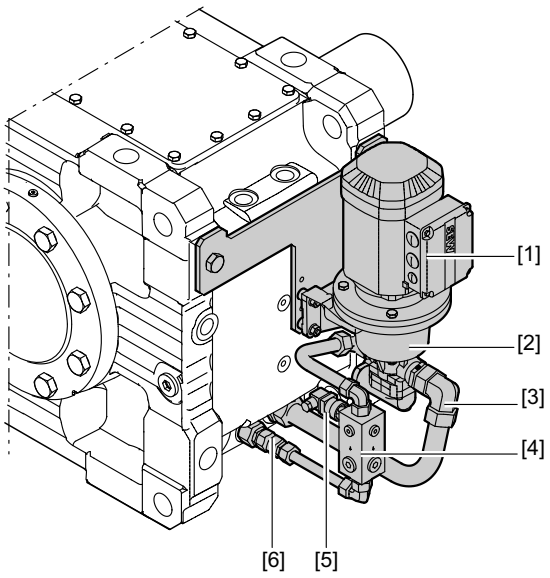
Tenir compte également des instructions de la notice d'exploitation du fabricant de la motopompe concernée.

Les illustrations suivantes présentent les réducteurs dans les positions M1 et M5 avec les surfaces de montage standard pour la motopompe.

REMARQUE

Toute autre surface de montage que celles définies en standard nécessite une révision de la construction de la tubulure. Le cas échéant, cela peut avoir une influence sur la viscosité minimale de l'huile. Une étude et vérification spécifique complète est nécessaire. Consulter l'interlocuteur SEW local.

Position M1 / Surface de montage F6

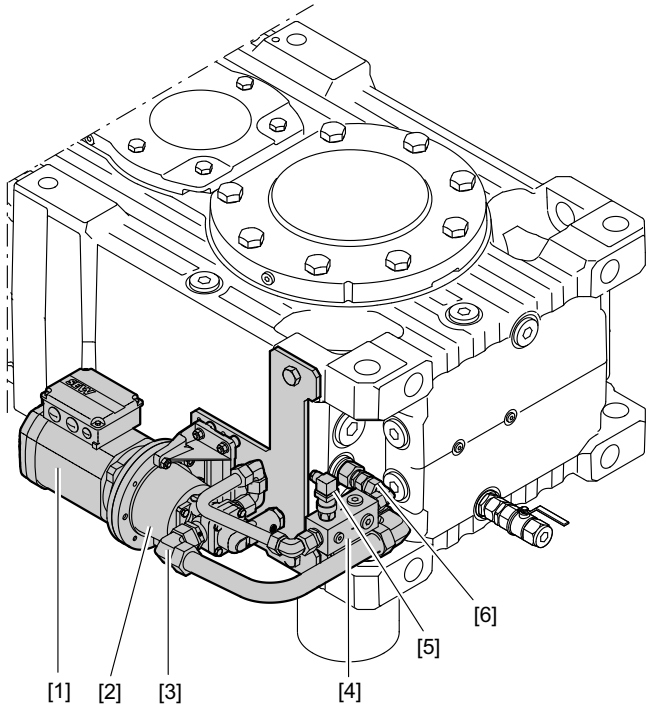


18014417388433163

[1] Moteur de pompe
[2] Pompe à huile
[3] Tuyau d'aspiration
[4] Bloc de mesure
[5] Pressostat
[6] Tuyau de pression

23055324/FR – 05/2019

Position M5 / Surface de montage F1



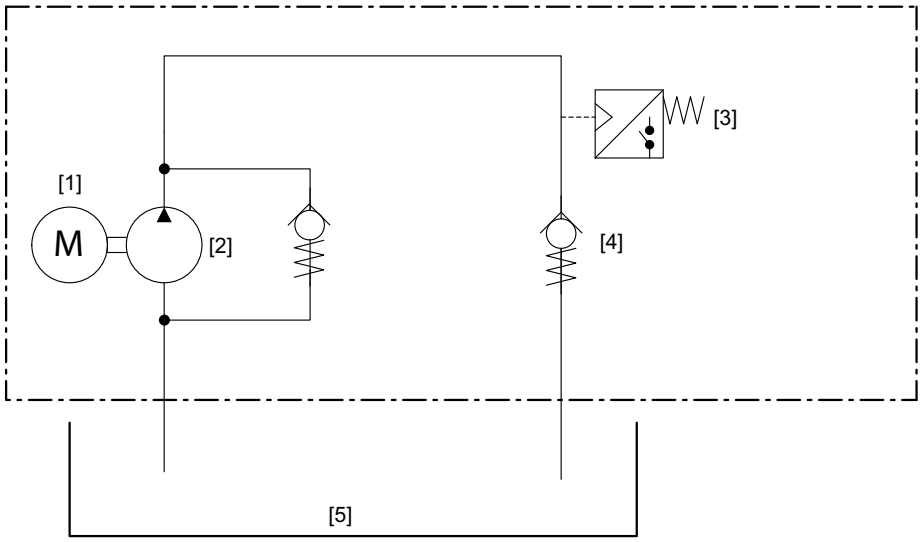
9007218133694859

[1] Moteur de pompe
[2] Pompe à huile
[3] Tuyau d'aspiration
[4] Bloc de mesure
[5] Pressostat
[6] Tuyau de pression

23055324/FR – 05/2019

Plan hydraulique

L'illustration suivante présente un exemple de structure d'unité de lubrification.



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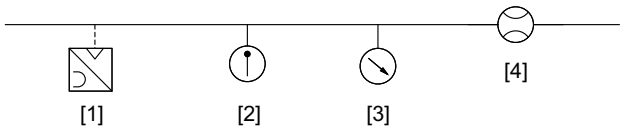
[1] Moteur
[2] Pompe à huile
[3] Pressostat
[4] Clapet antiretour
[5] Réducteur

L'illustration suivante montre les options possibles qui peuvent être montées.



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[1] Capteur de pression
[2] Thermomètre
[3] Manomètre
[4] Contrôleur de débit

23055324/FR – 05/2019

1.1.2 Généralités

La motopompe est livrée comme unité complète, mais sans raccordements électriques.

Standard

Les éléments suivants sont fournis en standard avec la motopompe.

- Pompe à huile avec moteur asynchrone monté directement **(pompe toujours entraînée)**
- Pressostat destiné à surveiller la pression de la pompe. Signal d'avertissement ou de déclenchement dès que la pression d'huile est < 0,5 bar.
- Bloc de mesure (pressostat monté en standard)

Équipements en option

La motopompe peut être équipée en option avec les composants suivants.

- Contact de température /NTB avec seuil pour surveillance du groupe de refroidissement, donc avertissement, voire arrêt du réducteur lorsque la température de l'huile est > 90 °C.
- Montés sur le bloc de mesure :
  - Manomètre
  - Thermomètre
  - Contrôleur de débit
  - Capteur de pression

23055324/FR – 05/2019

1.1.3 Fonction

Tenir compte des remarques suivantes concernant l'utilisation des différents composants.

Pompe à huile

Le moteur de pompe doit être enclenché 20 s avant le démarrage du réducteur et fonctionne toujours en même temps que le réducteur.

Pour les tailles de réducteur X140 à X320, la pression de l'installation en cas d'utilisation de la pompe est limitée par un limiteur de pression intégré.

REMARQUE

Le réglage usine du limiteur de pression de la pompe à huile ne doit en aucun cas être modifié !

Unité de lubrification

Au démarrage du réducteur, l'unité de lubrification fonctionne toujours avec → viscosité de démarrage de 5000 cSt max.

Moteur

Un démarrage à froid de la motopompe peut entraîner un besoin accru en courant du moteur. C'est la raison pour laquelle, la protection contre les surcharges du moteur devrait être supérieure au besoin nominal.

Contact de température /NTB (en option)

La surveillance de température de l'installation s'effectue via un contact de température /NTB pour le raccordement sur un système de pilotage de l'exploitant.

- Si T > 90 °C → **ARRÊT DU RÉDUCTEUR / AVERTISSEMENT**

Généralités

Prévoir au démarrage de la motopompe une temporisation à l'enclenchement de 10 s pour le pressostat.

23055324/FR – 05/2019

1.1.4 Prescriptions de verrouillage

Mise en route du réducteur

Le réducteur peut être mis en route si la condition suivante est remplie.

- Pression d'huile p > 0,5 bar (temporisation à l'enclenchement de 10 s)
- Température de l'huile T < 90 °C (en option)

Arrêt du réducteur / Avertissement

Arrêt du réducteur / Avertissement, si l'une des conditions suivantes est remplie.

- Pression d'huile p < 0,5 bar
- Température de l'huile T > 90 °C (en option)

1.1.5 Tailles et sélection

Les caractéristiques de puissance de la motopompe standardisée sont récapitulées dans le tableau suivant.

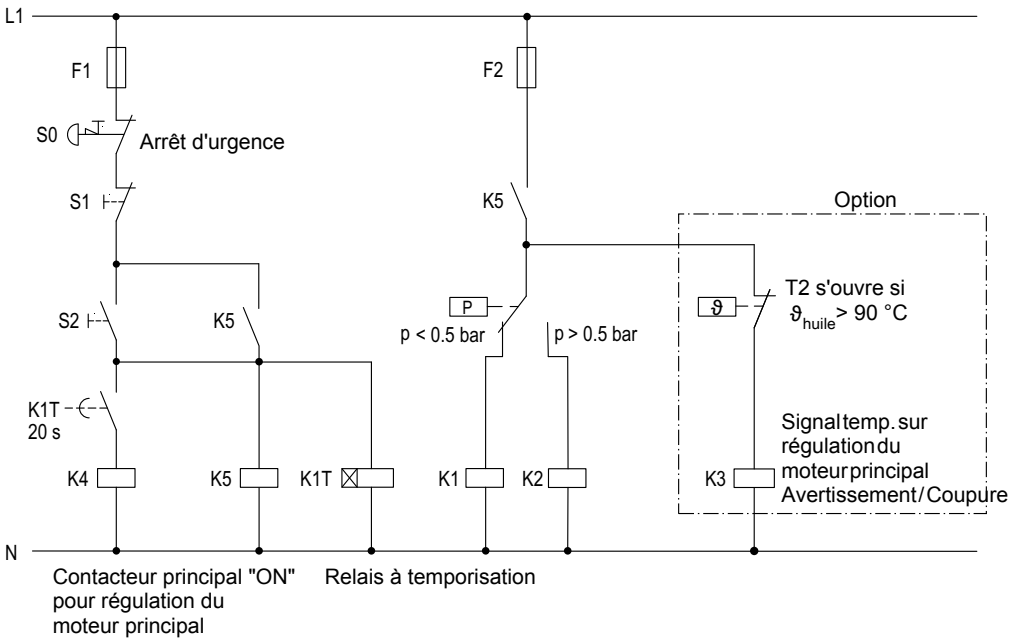
Taille ONP1L	Taille pompe à huile	Données moteur			Puissance de raccordement moteur pompe à huile en kW	Moteur Global en Hz	Débit à 1500 tr/min
		Type	Norme CEI	Nb pôles			
ONP1L 6	KF 6 RF	DRN	80MK	4	0.55	50/60	8.4
ONP1L 8	KF 8 RF	DRN	80MK	4	0.55	50/60	10.5
ONP1L 10	KF 10 RF	DRN	80M	4	0.75	50/60	13.7
ONP1L 12	KF 12 RF	DRN	90S	4	1.1	50/60	17.1
ONP1L 16	KF 16 RF	DRN	90S	4	1.1	50/60	21.8
ONP1L 20	KF 20 RF	DRN	90L	4	1.5	50/60	27.1
ONP1L 25	KF 25 RF	DRN	100L	4	2.2	50/60	34.0

23055324/FR – 05/2019

1.2 Schéma de branchement (schéma de principe)

Les schémas de branchement montrent la possible configuration du système de pilotage d'une unité de lubrification.

1.2.1 Circuit électrique de commande avec contact de température /NTB en option



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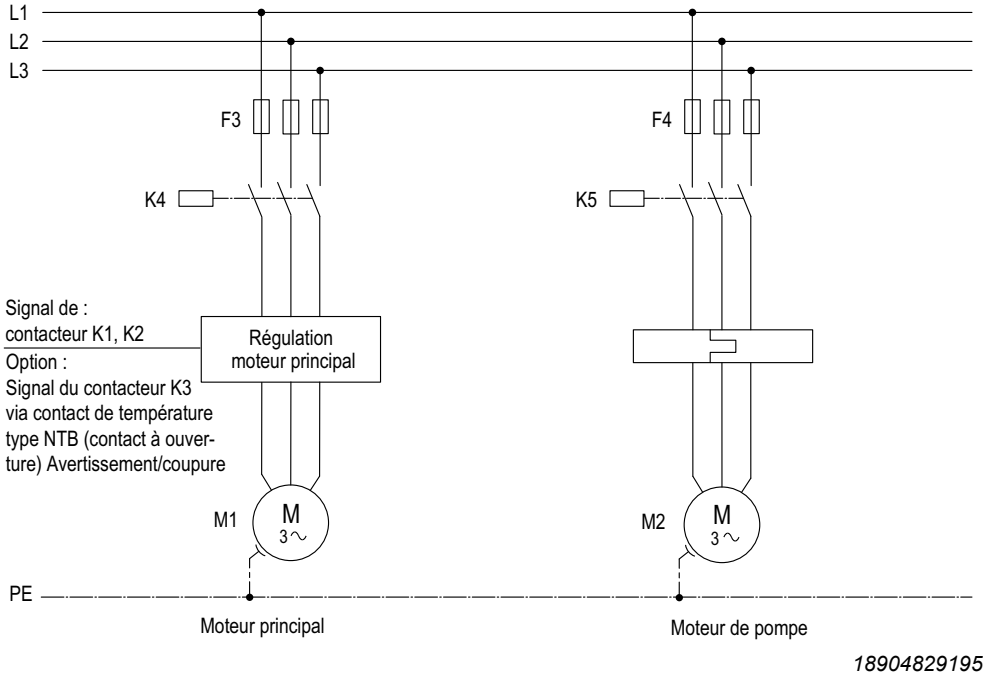
1.2.2 Circuit principal



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23055324/FR – 05/2019

1.3 Installation et montage

1.3.1 Raccordement mécanique

Raccorder la motopompe selon les indications en respectant les prescriptions nationales en vigueur pour le circuit de lubrification.

Respecter en outre les conditions suivantes.

- La réduction des sections de tuyaux indiquées n'est pas autorisée.
- Lors du choix de la tubulure, des flexibles et des éléments de raccordement, s'assurer de l'épaisseur correcte de la paroi et du matériau adéquat.

1.3.2 Raccordement électrique

Respecter les prescriptions nationales en vigueur pour les raccordements électriques.

En exécution standard, raccorder les composants suivants.

- Moteur
- Contact de température (en option)
- Pressostat

Respecter les instructions suivantes.

- Veiller en particulier au bon sens de rotation de la pompe à huile.
- Prendre connaissance de la feuille de caractéristiques du moteur.
- Le moteur de pompe doit être enclenché 20 s avant le démarrage du réducteur et fonctionne toujours en même temps que le réducteur.
- Le pressostat déclenche une alarme lorsque la pression est inférieure à 0,5 bar.

En cas d'utilisation d'options :

- Raccorder le contact de température /NTB au système de pilotage de l'exploitant.
- Raccorder le contrôleur de débit au système de pilotage de l'exploitant.
- Raccorder le capteur de débit au système de pilotage de l'exploitant.

Respecter les instructions suivantes.

- En cas d'utilisation d'un contact de température /NTB, celui-ci doit être intégré dans le circuit électrique de manière à ce qu'un signal d'avertissement soit déclenché ou l'entraînement principal coupé lorsque le point de déclenchement de 90 °C est atteint.

23055324/FR – 05/2019

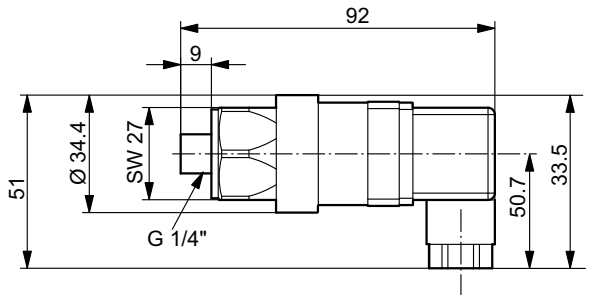
1.3.3 Pressostat /PS

Le pressostat signale la pression d'huile correcte dans le tuyau de pression et donc le bon fonctionnement de la lubrification sous pression. C'est pourquoi le pressostat doit être surveillé par l'exploitant.

Pendant la phase de démarrage du réducteur équipé d'une pompe attelée, la montée en pression peut être retardée. Une montée en pression lente au cours de cette phase peut générer un signal de défaut sur le pressostat ; ce signal peut néanmoins être temporisé. La temporisation du pressostat doit alors être limitée à une durée comprise entre **5 et 10 s maximum**.

Une temporisation plus importante risque de détériorer le réducteur, ce qui n'est pas admissible.

Cotes



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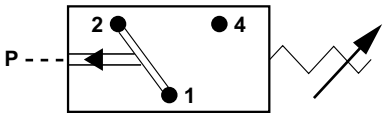
Raccordement électrique



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[1] [2] Contact à ouverture
[1] [4] Contact à fermeture

Caractéristiques techniques

- Pression de commutation : 0,5 ± 0,2 bar
- Puissance de commutation maximale : 4 A – V_{AC} 250 ; 4 A – V_{DC} 24
- Connecteur : DIN EN 175301-803
- Couple de serrage des vis de fixation à l'arrière du connecteur pour le raccordement électrique = 0,25 Nm

1.3.4 Température pour le démarrage de la motopompe

Pour assurer le fonctionnement correct de la motopompe, l'huile réducteur doit présenter une viscosité minimum. La viscosité dépend de l'huile utilisée et de la température d'huile dans les tuyaux / conduites d'alimentation d'huile et de la pompe à huile. Respecter les consignes du chapitre "Lubrifiants homologués" (→ 🗎 17).

En cas d'utilisation d'une motopompe à des températures ambiantes basses, il peut être nécessaire d'adapter la motopompe. Si nécessaire, consulter l'interlocuteur SEW local.

23055324/FR – 05/2019

1.4 Remarque concernant le contrôle du niveau d'huile

L'utilisation d'une unité de lubrification peut avoir une influence sur le niveau d'huile. Les quantités d'huile indiquées sur la plaque signalétique sont indicatives et concernent uniquement le réducteur. La quantité d'huile correcte à retenir est marquée sur le regard d'huile, sur l'indicateur de niveau d'huile visuel ou sur la jauge de niveau d'huile.

Suivre les instructions du chapitre "Contrôler le niveau d'huile" de la notice d'exploitation *Réducteurs industriels de série X...*

1.4.1 Besoins supplémentaires en huile réducteur

Les quantités de lubrifiant nécessaires pour la motopompe, qui doivent être ajoutées en plus dans le réducteur, sont indiquées dans le tableau suivant.

Taille	Quantité de lubrifiant en litre(s)
ONP1L 6	1.0
ONP1L 8	
ONP1L 10	
ONP1L 12	
ONP1L 16	1.5
ONP1L 20	
ONP1L 25	

23055324/FR – 05/2019

1.5 Mise en service

1.5.1 Remarques

ATTENTION

Une mise en service non conforme du réducteur avec lubrification sous pression risque d'endommager le réducteur.

Risque de dommages matériels.

- Tenir compte des remarques suivantes.

- Avant la mise en service, vérifier le bon fonctionnement des dispositifs de surveillance (pressostat, contrôleur de débit, contact de température /NTB, etc.).
- Le réducteur ne doit pas être mis en service si le pressostat n'est pas raccordé.
- Tenir compte du fait qu'avant la première mise en route du réducteur et après chaque remplacement d'huile, la pompe à huile doit fonctionner au moins 10 minutes afin que toutes les cavités de remplissage d'huile soient remplies. Arrêter à nouveau la pompe à huile et contrôler rapidement le niveau d'huile. Si besoin, corriger le niveau d'huile.
- Tenir compte du fait que la pompe à huile doit fonctionner 20 secondes avant la mise en service du réducteur.
- Attention : en cas de températures ambiantes basses, l'exploitation des réducteurs avec pompe à huile n'est autorisée qu'avec un dispositif de réchauffage de l'huile. Pour plus d'informations, consulter le chapitre "Température pour le démarrage de l'unité de lubrification".

1.5.2 Vider la pompe à huile de son air

⚠ AVERTISSEMENT

Danger dû à la fuite et à la projection d'huile réducteur.

Blessures graves.

- Porter impérativement des lunettes de protection.
- Vider la pompe à huile de son air avec une extrême précaution.

Respecter la procédure suivante si la pompe n'alimente pas le système en huile immédiatement après le démarrage.

- Remplir la pompe à huile avec de l'huile.
- Vider l'unité de lubrification de son air du côté pression pendant le démarrage, si possible au niveau du point le plus haut.

23055324/FR – 05/2019

1.5.3 Contrôleur de débit

Respecter la procédure suivante.

1. Procéder à la mise en service de la pompe à huile.
2. Raccorder le contrôleur de débit.
3. Calibrer le niveau de débit haut, tenir compte des remarques dans la documentation fournisseur (voir annexe).
4. Affecter le seuil de déclenchement du contrôleur de débit à la diode 4 ou 5 ; tenir compte des remarques dans la documentation fournisseur.
5. Intégrer le seuil de commutation dans l'installation de telle sorte que le réducteur soit arrêté en cas de dépassement par le bas.

1.6 Contrôle et entretien

REMARQUE

Lire au préalable la notice d'exploitation du fabricant du système de refroidissement.

1.6.1 Intervalles de contrôle et d'entretien

Respecter les intervalles de contrôle et d'entretien suivants.

Intervalle de temps	Que faire ?
• **Selon les conditions d'utilisation, au plus tard tous les 12 mois**	• Vérifier l'état de la motopompe, si nécessaire remplacer l'élément de filtrage.
• **Variable (en fonction des conditions environnantes)**	• Vérifier l'étanchéité des conduites en tuyau flexible. La durée d'utilisation des tuyaux flexibles ne doit pas être supérieure à six ans au-delà de la date indiquée par le fabricant sur le tuyau.

1.6.2 Vérifier les conduites en tuyau flexible

ATTENTION

Les conduites et tuyaux flexibles sont sujets à une usure naturelle, y compris en cas d'entreposage et d'utilisation corrects. Leur durée d'utilisation est par conséquent restreinte.

- La durée d'utilisation des tuyaux flexibles ne doit pas être supérieure à six ans au-delà de la date indiquée sur le tuyau par le fabricant.
- L'exploitant de l'installation doit assurer le remplacement des tuyaux flexibles à intervalles convenables, même si ceux-ci ne présentent pas de défaut mettant en cause la sécurité.
- Faire effectuer un contrôle de sécurité des tuyaux flexibles par un spécialiste au moins une fois par an.

23055324/FR – 05/2019

1.7 Défauts de fonctionnement

Défaut	Cause possible	Remède
La pompe à huile ne s'amorce pas.	• Présence d'air dans les conduits • Le moteur ne tourne pas. • Le moteur tourne dans le mauvais sens. • Pas assez d'huile dans le réducteur • Mauvais type d'huile	• Remplir d'huile le tuyau d'aspiration et la pompe à huile. • Vider le tuyau de pression de son air au démarrage. • Vérifier les raccordements électriques. • Contrôler le niveau d'huile du réducteur. • Vérifier le type d'huile (en particulier en cas de températures basses).
Débit de la pompe à huile insuffisant	• Mauvaise vitesse du moteur • Circuit d'huile bloqué • Dépression d'aspiration trop forte • Mauvais type d'huile	• Vérifier la vitesse du moteur de pompe. • Ouvrir les évents et les robinets. • Augmenter la section du tuyau d'aspiration. • Diminuer la hauteur d'aspiration. • Vérifier le type d'huile (en particulier en cas de températures basses).
Pompe à huile très bruyante	• Dépression d'aspiration trop forte	• Augmenter la section du tuyau d'aspiration. • Diminuer la hauteur d'aspiration. • Éviter tout angle saillant dans le tuyau d'aspiration. • Éviter les réductions dans le tuyau d'aspiration.
La pompe à huile produit de la mousse.	• Le tuyau d'aspiration est poreux. • Pas assez d'huile dans le réducteur	• Vérifier l'étanchéité des presse-étoupes. • Contrôler le niveau d'huile du réducteur.
Le pressostat ne déclenche pas.	• Présence d'air dans les conduits • Raccordement non conforme du pressostat • Pressostat défectueux	• Remplir d'huile le tuyau d'aspiration et la pompe à huile. • Vider le tuyau de pression de son air au démarrage. • Contrôler le raccordement. • Remplacer le pressostat.

23055324/FR – 05/2019

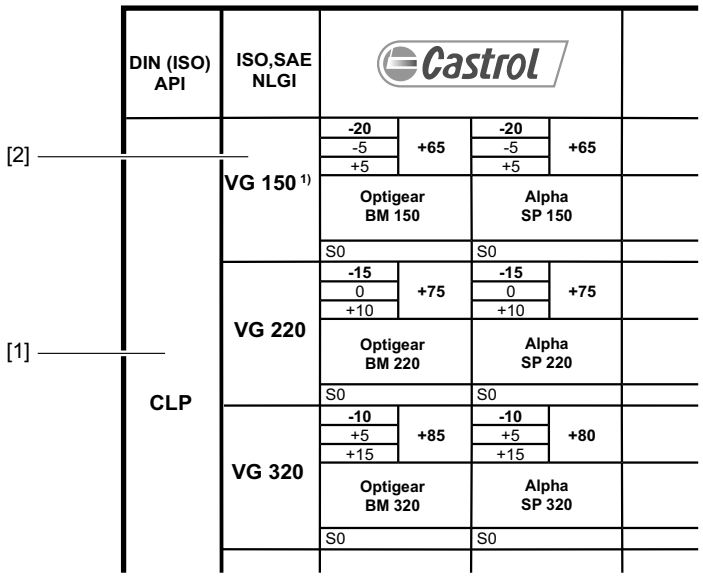
1.8 Lubrifiants homologués

Ce chapitre décrit les lubrifiants autorisés et les températures admissibles pour les réducteurs industriels SEW.

REMARQUE

- La viscosité et le type d'huile sont définis par SEW-EURODRIVE en fonction de la commande (voir accusé de réception de commande et plaque signalétique).
- En cas d'utilisation de lubrifiants biologiques ou agroalimentaires et d'huiles polyglycol, consulter l'interlocuteur SEW local.
- Vérifier la compatibilité des graisses et huiles utilisées.
- Les tableaux indiquent les lubrifiants homologués par SEW-EURODRIVE.
- Les huiles de classes de viscosité identiques et de fabricants différents ne présentent par les mêmes caractéristiques. Les températures de bain d'huile minimales admissibles sont notamment spécifiques aux fabricants. Ces températures sont indiquées dans les tableaux de lubrifiants.
- Les températures de bain d'huile minimales admissibles dépendent du type de lubrification. Ces températures sont indiquées dans les tableaux de lubrifiants. Ces valeurs correspondent à la viscosité maximale des différents lubrifiants.
- Les valeurs indiquées dans les tableaux des lubrifiants sont valables au moment de la mise à l'impression du document. Les caractéristiques des lubrifiants sont soumises à un changement dynamique de la part des fabricants de lubrifiants.

1.8.1 Structure des tableaux et des abréviations



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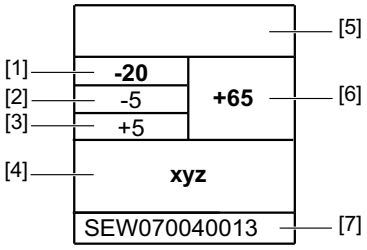
[1] Type de lubrifiant
[2] Classe de viscosité

Abréviations

Symbole	Dénomination
CLP	= huile minérale

Symbole	Dénomination
CLP HC	= polyalphaoléfine synthétique (PAO)
E	= huile à base d'ester
▭	= lubrifiant minéral
▬	= lubrifiant synthétique
	= lubrifiant pour l'industrie agroalimentaire (conforme à la norme **NSF H1**)
	= huile biologique (lubrifiant pour l'agriculture et les eaux et forêts)
1)	= lubrifiant autorisé uniquement si le facteur de service $F_s \geq 1,3$

1.8.2 Explications concernant les différents lubrifiants



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[1] Température minimale de démarrage à froid en °C en cas de lubrification par barbotage[1)]
[2] Température minimale de démarrage à froid en °C pour entraînements avec pompes jusqu'à une viscosité de l'huile de 5000 cSt[1)] max.
[3] Température minimale de démarrage à froid en °C pour entraînements avec pompes jusqu'à une viscosité de l'huile de 2000 cSt[1)] max.
[4] Nom commercial
[5] Fabricant
[6] Température max. du bain d'huile en °C ! NE DOIT PAS ÊTRE DÉPASSÉE !
[7] Homologations

1) En cas de température basse, préchauffer l'huile à la température minimale indiquée, p. ex. en utilisant un dispositif de réchauffage de l'huile. La viscosité maximale admissible de l'huile pour chaque type de pompe est indiquée dans le chapitre suivant.

1.8.3 Explications concernant les unités de lubrification et la viscosité de l'huile

La motopompe est dimensionnée pour une viscosité de l'huile de **5000 cSt**.

23055324/FR – 05/2019

1.8.4 Tableaux des lubrifiants

Les valeurs des tableaux des lubrifiants sont valables au moment de la mise à l'impression du document.

[1]	[2]	SEW EURODRIVE			Castrol			FUCHS			Mobil®			KLÜBER LUBRICATION			Shell			TOTAL		
CLP	VG 150 [1]	-20 -5 +5	+65	SEW GearOil Base 150 E[1]	-20 -5 +5	+65	Optigear BM 150	-20 -5 +5	+65	Alpha SP 150	-20 -5 +5	+65	Renolin CLP 150 Plus	-20 -5 +5	+65	Renolin HighGear 150	-20 -5 +5	+65	Mobilgear 600 XP 150	-20 -5 +5	+65	Klüberoil GEM 1-150 N				
		SEW070040013											SEW070030013											
	VG 220	-15 0 +10	+75	SEW GearOil Base 220 E[1]	-15 0 +10	+75	Optigear BM 220	-15 0 +10	+75	Alpha SP 220	-15 0 +10	+75	Renolin CLP 220 Plus	-15 0 +10	+75	Renolin HighGear 220	-15 0 +10	+75	Mobilgear 600 XP 220	-15 0 +10	+75	Klüberoil GEM 1-220 N	-15 0 +10	+75	Shell Omala Oil F 220	-15 0 +10	+75	Carter EP 220
		SEW070040013											SEW070030013											
	VG 320	-10 +5 +15	+85	SEW GearOil Base 320 E[1]	-10 +5 +15	+80	Optigear BM 320	-10 +5 +15	+80	Alpha SP 320	-10 +5 +15	+80	Renolin CLP 320 Plus	-10 +5 +15	+80	Renolin HighGear 320	-10 +5 +15	+80	Mobilgear 600 XP 320	-10 +5 +15	+80	Klüberoil GEM 1-320 N	-10 +5 +15	+80	Shell Omala Oil F 320	-10 +5 +15	+80	Carter EP 320
		SEW070040013											SEW070030013											
	VG 460	-5 +10 +20	+90	SEW GearOil Base 480 E[1]	-5 +10 +20	+90	Optigear BM 460	-5 +10 +20	+90	Alpha SP 460	-5 +10 +20	+90	Renolin CLP 460 Plus	-5 +10 +20	+90	Renolin HighGear 460	-5 +10 +20	+90	Mobilgear 600 XP 460	-5 +10 +20	+90	Klüberoil GEM 1-460 N	-5 +10 +20	+90	Shell Omala Oil F 460	-5 +10 +20	+90	Carter EP 460
		SEW070040013											SEW070030013											
	VG 680	0 +15 +25	+90	SEW GearOil Base 680 E[1]	0 +15 +25	+90	Optigear BM 680	0 +15 +25	+90	Alpha SP 680	0 +15 +25	+90	Renolin CLP 680 Plus	0 +15 +25	+90	Renolin HighGear 680	0 +15 +25	+90	Mobilgear 600 XP 680	0 +15 +25	+90	Klüberoil GEM 1-680 N	0 +15 +25	+90	Carter EP 680			
		SEW070040013											SEW070030013											
	VG 1000	+5 +20 +30	+90	Optigear BM 1000																				

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Les valeurs des tableaux des lubrifiants sont valables au moment de la mise à l'impression du document.

[1]								
[2]	Castrol	FUCHS	Mobil®	KLÜBER LUBRICATION	Shell	TOTAL		
CLP HC								
VG 32 [1]			-40 -30 -25 / +30 SHC 624					
VG 68 [1]		-35 -20 -10 / +50 Renolin Unisyn CLP 68	-40 -25 -15 / +50 SHC 626	-35 -20 -10 / +50 Klübersynth GEM 4-68 N	-40 -20 -10 / +50 Omala S4 GX 68			
VG 150 [1]	-25 -10 0 / +70 Alphasyn EP 150	-30 -10 0 / +70 Optigear Synthetic X 150	-30 -10 0 / +70 Renolin Unisyn CLP 150	-30 -10 0 / +75 SHC 629	-35 -15 -5 / +75 SHC Gear 150	-25 -10 0 / 70 Klübersynth GEM 4-150 N	-30 -10 0 / +75 Omala S4 GX 150	-35 -15 -5 / +75 Carter SH 150
VG 220	-25 -5 +5 / +80 Alphasyn EP 220	-25 -5 +5 / +80 Optigear Synthetic X 220	-25 -5 +5 / +80 Renolin Unisyn CLP 220	-20 0 +10 / +75 HighGear Synth 220	-25 -5 0 / +85 SHC 630	-30 -10 +5 / +85 SHC Gear 220	-25 -5 +5 / +80 Klübersynth GEM 4-220 N	-25 -5 +5 / +85 Omala S4 GX 220	-25 -5 +5 / +80 Carter SH 220
VG 320	-20 0 +10 / +90 Alphasyn EP 320	-20 0 +10 / +90 Optigear Synthetic X 320	-20 0 +10 / +90 Renolin Unisyn CLP 320	-15 0 +15 / +85 HighGear Synth 320	-20 0 +10 / +95 SHC 632	-25 -5 +10 / +95 SHC Gear 320	-20 0 +10 / +95 Klübersynth GEM 4-320 N	-20 0 +10 / +95 Omala S4 GX 320	-20 0 +10 / +90 Carter SH 320
VG 460	-15 +5 +15 / +100 Alphasyn EP 460	-15 +5 +15 / +100 Optigear Synthetic X 460	-15 +5 +15 / +100 Renolin Unisyn CLP 460	-10 +5 +20 / +95 HighGear Synth 460	-15 +5 +15 / +105 SHC 634	-20 0 +15 / +110 SHC Gear 460	-15 +5 +20 / +105 Klübersynth GEM 4-460 N	-15 +5 +15 / +105 Omala S4 GX 460	-15 +5 +15 / +100 Carter SH 460
VG 680		-10 +10 +25 / +110 Optigear Synthetic X 680	-10 +10 +25 / +110 Renolin Unisyn CLP 680	-5 +10 +25 / +110 HighGear Synth 680	-10 +10 +25 / +110 SHC 636	-15 +10 +25 / +110 SHC Gear 680	-10 +10 +25 / +110 Klübersynth GEM 4-680 N	-10 +10 +25 / +110 Omala S4 GX 680	-10 +10 +25 / +110 Carter SH 680
VG 1000					-10 +15 +30 / +110 SHC 639	-10 +15 +30 / +110 SHC Gear 1000	0 +20 +30 / +110 Klübersynth EG4-1000		

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Les valeurs des tableaux des lubrifiants sont valables au moment de la mise à l'impression du document.

[1]	[2]	[3]	bremer & leguil			Castrol			FUCHS			KLÜBER LUBRICATION		
	CLP HC NSF H1	VG 68 [1]	-35 / -20 / -10	+45	Cassida Fluid HF 68	-40 / -25 / -15	+45	Optileb HY 68	-35 / -20 / -10	+45	Cassida Fluid HF 68	-35 / -20 / -10	+45	Klüberoil 4UH1-68 N
													S0	
		VG 220 [1]	-20 / -5 / +5	+75	Cassida Fluid GL 220	-25 / -5 / +5	+75	Optileb GT 220	-20 / -5 / +5	+75	Cassida Fluid GL 220	-25 / -5 / +5	+75	Klüberoil 4UH1-220 N
								SEW 070040313					S0	
		VG 460 [1]	-15 / +5 / +20	+90	Cassida Fluid GL 460	-15 / +5 / +20	+95	Optileb GT 460	-15 / +5 / +20	+90	Cassida Fluid GL 460	-15 / +5 / +15	+95	Klüberoil 4UH1-460 N
								SEW 070040313					S0	
	E	VG 460							-15 / +5 / +15	+95	Plantogear 460 S	-15 / +5 / +15	+95	Klüberbio CA2-460
													S0	

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2 Documentation du fournisseur

Sommaire

23055324 / FR – 05/2019

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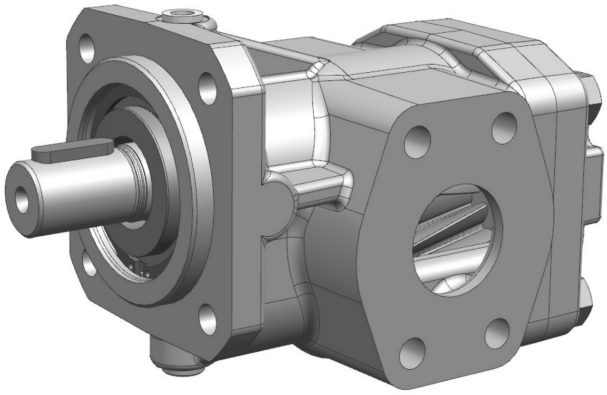
Operating instructions (Translation)



Gear pump KF 2.5 - 630

88024710002-26

Englisch

2017-09-12

KRACHT

23055324/FR – 05/2019

Table of Content

23055324/FR – 05/2019

23055324/FR – 05/2019

23055324/FR – 05/2019

1 General

1.1 About the documentation

These operating instructions describe the installation, operation and maintenance of the following device:

Gear pump KF 2.5 - 630

The device is manufactured in different versions. Information about the version concerned in the individual case can be found on the device's type plate.

These operating instructions are a component of the device and must be kept accessible for the personnel near the device at all times.

If you have any questions about these operating instructions, please contact the manufacturer.

1.2 Manufacturer´s address

KRACHT GmbH
Gewerbestraße 20
DE 58791 Werdohl
phone: +49 2392 935-0
fax: +49 2392 935-209
email: info@kracht.eu
web: www.kracht.eu

1.3 Applicable documents

1. KTR Kupplungstechnik GmbH, DE 48407 Rheine
   - KTR-N 40210: Coupling operating/assembly instruction Rotex

Excerpts from these documents are included in these operating instructions.

If required, the original documents can be requested from the respective manufacturer.

23055324/FR – 05/2019

1.4 Symbolism

	DANGER Identification of an immediate hazard, which would result in death or severe bodily injury if not avoided.
	WARNING Identification of a potential medium risk hazard, which would lead to death or severe bodily injury if not avoided.
	CAUTION Identification of a low risk hazard, which could lead to minor or medium bodily injury if not avoided.
	NOTICE Flagging of notices to prevent property damage.
⚠	Identification of basic safety instructions. Non-compliance can lead to hazards for people and the device.
☞	Flagging of special user tips and other especially useful or important information.

23055324/FR – 05/2019

2 Safety

2.1 Intended use

1. The device has been designed for operation with fluid. Dry operation is not permitted.
2. The device may be operated in filled condition only.
   The medium must be compatible with the materials used in the device. The chemical competence is necessary for this. Be careful with ethylene oxide or other cathalytic or exothermic or self-decomposing materials. Please consult the manufacturer in cases of doubt.
3. The device may be operated only in usual industrial atmospheres. If there are any aggressive substances in the air, always ask the manufacturer.
4. Operation of the device is only permissible when complying with the operating instructions and applicable documents.
   Deviating operating conditions require the express approval of the manufacturer.
5. In case of any use of the device not according to specification, any warranty is voided.

2.2 Personnel qualification and training

The staff designated to assemble, operate and service the device must be properly qualified. This can be through training or specific instruction. Personnel must be familiar with the contents of this operating instructions.

Read the operating instructions thoroughly before use.

2.3 Basic safety instructions

1. Comply with existing regulations on accident prevention and safety at work along with any possible internal operator regulations.
2. Pay attention to the greatest possible cleanliness.
3. Wear suitable personal protection equipment.
4. Do not remove, make illegible or obliterate type plates or other references on the device.
5. Do not make any technical changes on the device.
6. Maintain and clean the device regularly.
7. Use spare parts approved by the manufacturer only.

2.4 Basic hazards

DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Take measures against accidental touching of rotating parts.

WARNING

Rotating parts!
Danger of injury from flying parts.
1. Enclose rotating parts so as to avoid any danger from flying parts in the event of breakage or malfunction.

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

23055324/FR – 05/2019

⚠ WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.

1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.

⚠ WARNING

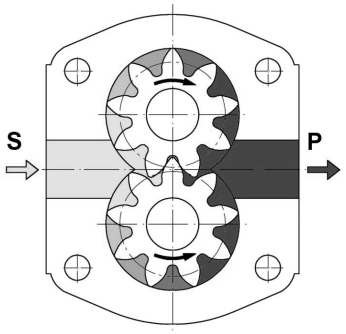
Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.

1. Do not operate the device against closed shut-off devices.
2. Do not operate the device in the false direction of rotation.

3 Device description

3.1 Functional principle

KF/KFF series pumps are external gear pump types that work according to the positive displacement principle.



S = Suction connection
P = Pressure connection

When rotated, two gearwheels meshing together produce a volume enlargement as a result of the opening of the tooth spaces on the suction side (S), so that medium can flow in and so that a corresponding volume is displaced simultaneously by immersion of the teeth into the filled tooth spaces on the pressure side (P). Fluid transport takes place through entrainment in the tooth gaps along the wall of the wheel chamber. The so-called geometric flow rate V_g is being displaced per wheel rotation. A value that is stated in technical documents as rated volume V_{gn} to specify the pump size.

The actually delivered amount of liquid does not correspond with the theoretical value, it is being reduced through losses due to the necessary tolerances. The losses are less the lower the operating pressure and the higher the viscosity of the medium.

Gear pumps are self-priming within wide limits. The displacement cycle describe initially takes place without exhibiting appreciable pressure build-up. Only after setting external loads, for example, through delivery heights, flow resistances, line elements, etc. will the required working pressure arise to overcome these resistances.

As usual with non-axial play compensated pumps, the lateral clearance between gear and front face has been set in such a way that the maximum allowable operating pressure is managed in an adequate and secure way.

Bearing and shaft seal of the device are lubricated by the media. The device's operating life will be reduced if the medium contains abrasive ingredients.

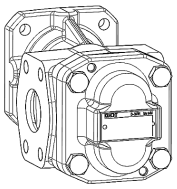
The shaft seal chamber is connected to the device's suction side. The pressure occurring at the shaft seal therefore corresponds to the pressure at the

23055324/FR – 05/2019

suction connection of the device. The permissible pressure is determined by the type of sealing.

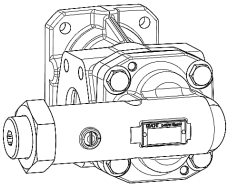
3.2 Possible versions

Gear pump with end cover



Standard

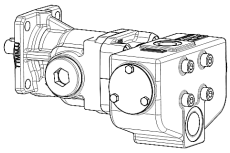
Gear pump with pressure relief valve



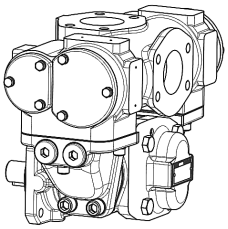
Directly attached pressure relief valves of the series "D" are used exclusively for protection of the gear pumps and may respond on a short-term basis only. Constant triggering of the valve can destroy the gear pump due to overheating.

Gear pump with universal valve

KF 2.5 - 25 U



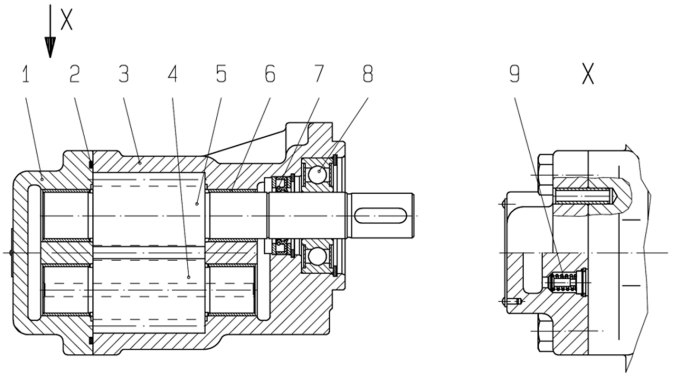
KF 32 - 80 U



Pumps with universal valve pump to the same pressure connection even when the direction of rotation of the drive shaft changes. Because of the operating principle, the pressure and suction connections remain the same under any direction of rotation. Select the mounting position so that the piston is in a horizontal position and the pressure port is at the top.

3.3 Basic design

3.3.1 KF 2.5 - 630 R/L/B (with end cover)

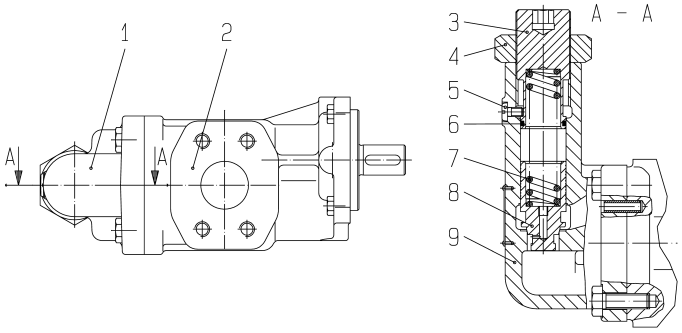


Explanation

1. End cover
2. O-Ring
3. Housing
4. Driven shaft
5. Driving shaft
6. Plain bearing bush
7. Shaft seal
   (see "Section: Seal types")
8. Outbord bearing
   (Mounting only: G; X)
9. Valve
   (Direction of rotation only: B)

23055324/FR – 05/2019

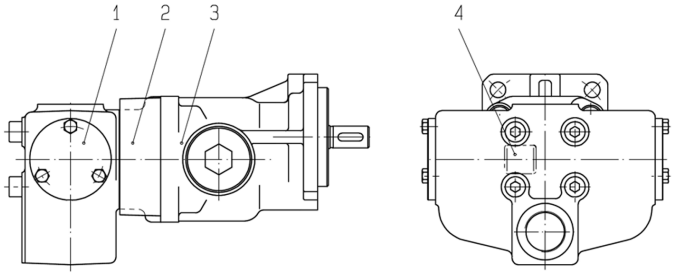
3.3.2 KF 2.5 - 630 R/L. .-D. (with pressure relief valve)



Explanation

1. Pressure relief valve
2. Pump
3. Adjustment screw
4. Hexagonal nut
5. Retaining screw
6. O-Ring
7. Compression spring
8. Valve cone
9. Housing

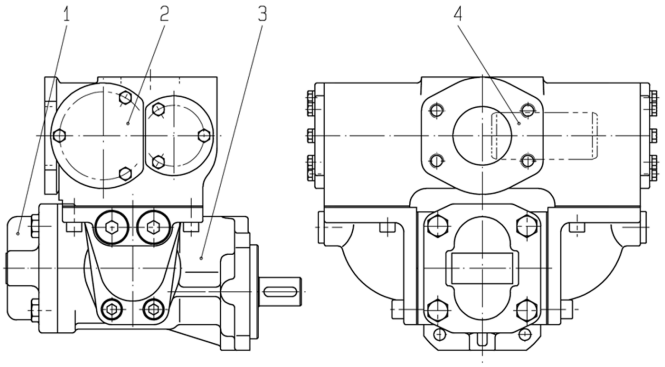
3.3.3 KF 2.5 - 25 U (with universal valve)



Explanation

1. Universal valve
2. Adapter
3. Pump
4. Piston

3.3.4 KF 32 - 80 U (with universal valve)



Explanation

1. End cover
2. Universal valve
3. Pump
4. Piston

23055324/FR – 05/2019

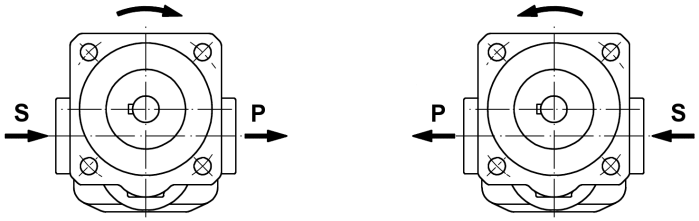
3.4 Rotation and delivery direction

The following definition applies with respect to the rotation and delivery direction of external gear pumps for pump connections positioned below the drive shaft:

Looking at the pump shaft end, the pumping flow is from left to right when the shaft is moving clockwise.

Looking at the pump shaft end, the pumping flow is from right to left when the shaft is moving counterclockwise.

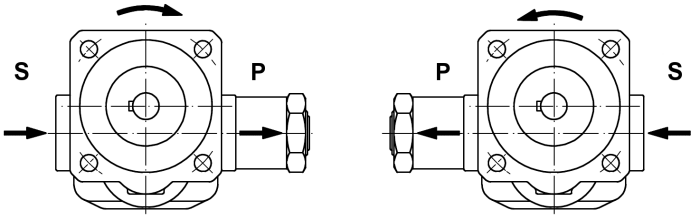
Gear pump with end cover



S = Suction connection

P = Pressure connection

Gear pump with pressure relief valve



S = Suction connection
P = Pressure connection

The direction of rotation is indicated by the bent arrow.

The flow direction is indicated by the straight arrows.

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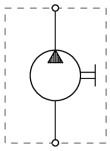
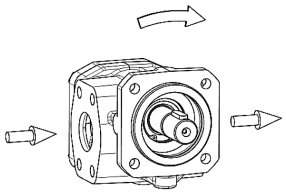
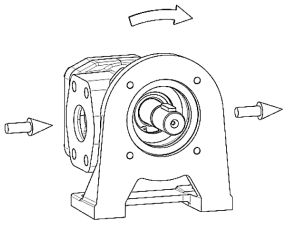
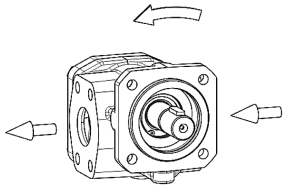
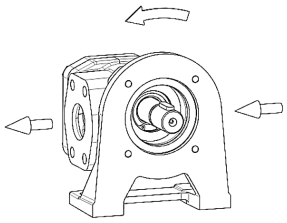
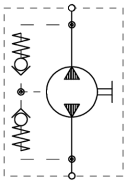
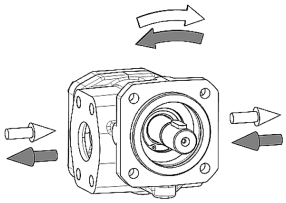
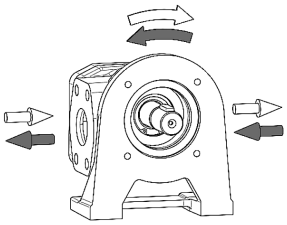
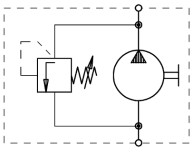
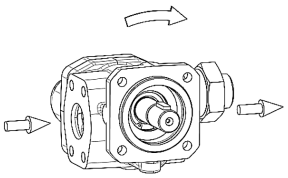
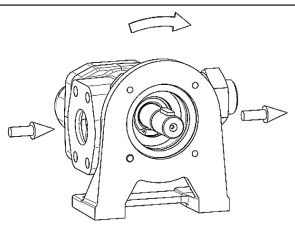
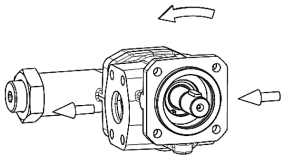
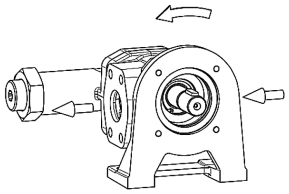
Hydraulic symbol	Flange mounting	Foot mounting
	**Gear pump with end cover**	
		
	KF . R F/G	KF . R W/X
		
	KF . L F/G	KF . L W/X
		
	KF . B F/G	KF . B W/X

23055324/FR – 05/2019

SEW EURODRIVE

Hydraulic symbol	Flange mounting	Foot mounting
	Gear pump with pressure relief valve	
		
	KF . R F/G. .-D.	KF . R W/X. .-D.
		
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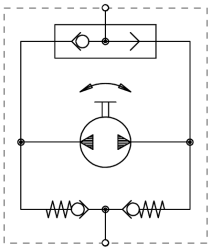
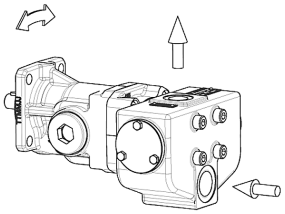
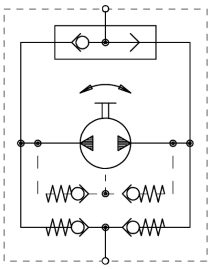
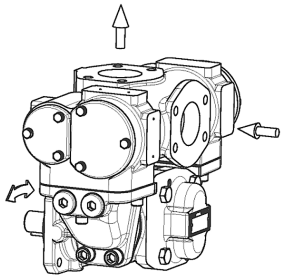
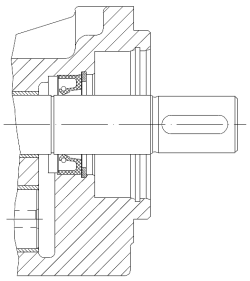
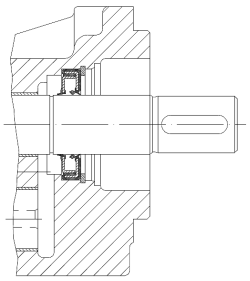
	**Gear pump with universal valve**	
		
	KF 2.5 - 25 U F/G	-
		
	KF 32 - 80 U F/G	-

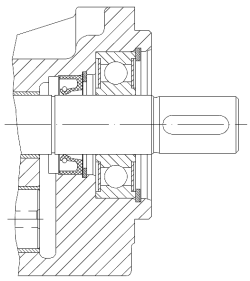
3.5 Types of seals



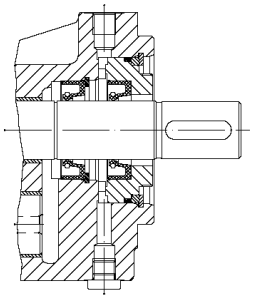
Rotary shaft seal
Seal type: 1; 2; 3; 9; 18; 31



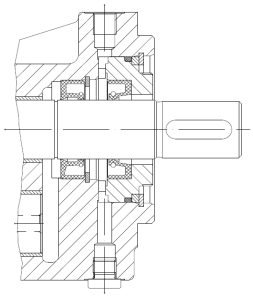
Rotary shaft seal
Seal type: 23



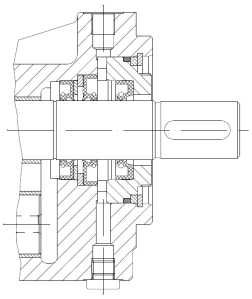
Rotary shaft seal
with outboard bearing
Seal type: 1; 2; 3; 9; 18; 31



Double rotary shaft seal
Connection borehole G1/8 (for Quench) (1)
Seal type: 4; 7; 19; 32

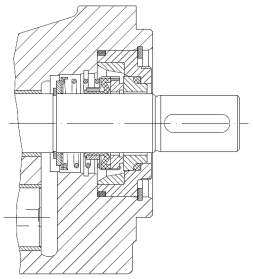


Double rotary shaft seal (for vacuum operation)
Connection borehole G1/8 (for Quench) (1)
Seal type: 4; 7; 19; 32
Special number 74

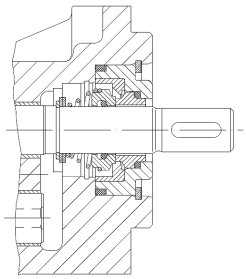


Triple rotary shaft seal (for vacuum operation + for normal operation)
Connection borehole G1/8 (for Quench) (1)
Seal type: 7
Special number 322
(only KF 32 - 80)

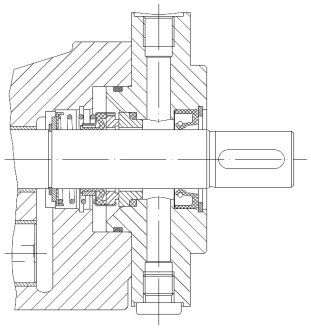
23055324/FR – 05/2019



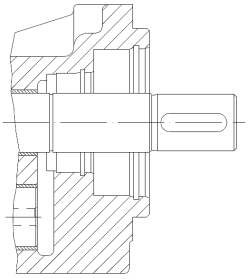
Mechanical seal
Seal type: 5; 40



Mechanical seal
Seal type: 6



Mechanical seal with Quench (1)
KF 2.5 - 25: Connection borehole G1/8 (for Quench) (1)
KF 32 - 80: Connection borehole G1/4 (for Quench) (1)
Seal type: 5
Special number 198



without shaft seal
(Leak oil drain through shaft sealing chamber)
Seal type: 30; 36

(1) See section 3.6 “Quench”

3.6 Quench

Versions with quench are used when absolute leak tightness is required on the shaft seal, e.g. when pumping media

- which cures upon contact with air.
- which crystallises upon contact with air humidity.
- the leakage of which must not be released into the environment.
- are under vacuum and their seal shall be gastight.

Select the mounting position so that the connection for the quench faces up.

23055324/FR – 05/2019

3.7 Type key

Ordering example KF 2.5 - 630												
KF		**40**		**R**	**F**		**1**	**/...**	**-**	**D15**	**-**	**...**
1.		2.		3.	4.		5.	6.		7.		8.

Explanation of type key KF 2.5 - 630				
1.	**Product name**			
2.	**Nominal size (Rated volume)**			
	V_{gn}	**Size 1:** 2.5; 4; 5; 6; 8; 10; 12; 16; 20; 25 **Size 2:** 32; 40; 50; 63; 80 **Size 3:** 100; 112; 125; 150; 180; 200 **Size 4:** 250; 315; 400; 500; 630		
3.	**Direction of rotation**			
	R	Clockwise	**B**	Clockwise and counterclockwise Flow direction alternating
	L	Counterclockwise	**U**	Clockwise and counterclockwise Flow direction consistent
4.	**Fixing type**			
	F	DIN flange without outboard bearing	**W**	Mounting angle without outboard bearing (KF 2.5 - 200)
	G	DIN flange with outboard bearing	**X**	Mounting angle with outboard bearing (KF 2.5 - 200)

23055324/FR – 05/2019

Explanation of type key KF 2.5 - 630				
5.	**Seal type**			
	1	Rotary shaft seal NBR (BABSL)	**18**	Rotary shaft seal FKM (BAUMX7)
	2	Rotary shaft seal FKM (BABSL)	**19**	Double rotary shaft seal NBR (BABSL)
	3	Rotary shaft seal PTFE (HN2390)	**23**	Rotary shaft seal FKM (MSS1) (Low temperature) (KF 2.5 - 80)
	4	Double rotary shaft seal PTFE (HN2390)	**30**	without shaft seal O-Ring FKM
	5	Mechanical seal with FKM secondary seals (AX15) C2S2V1G3G1 (KF 2.5 - 200) B10SV1G3G1 (KF 250 - 630)	**31**	Rotary shaft seal FKM (BABSL) (Low temperature) (KF 32 - 200)
	6	Mechanical contact seal with FFKM secondary seals (AX30) Q2Q2K1G3 (KF 2.5 - 25) Q2B2K1G3 (KF 32 - 200)	**32**	Double rotary shaft seal EPDM (R02-R) (not resistant to mineral oil)
	7	Double rotary shaft seal FKM (BABSL)	**36**	without shaft seal O-Ring NBR
	9	Rotary shaft seal EPDM (R02-R) (not resistant to mineral oil)	**40**	Mechanical seal with FKM secondary seals (L4) AQ2VFF
6.	**Special number for special versions**			
		See section 3.8 “Important special numbers”		
7.	**Pressure relief valve** (only for direction of rotation R or L)			
	D15	Adjustable from 0 - 15 bar	**D25**	Adjustable from 15 - 25 bar
	D30	Adjustable from 15 - 30 bar		
8.	**Housing and cover material**			
	No specification	EN-GJL-250 (GG-25)		
	GJS	EN-GJS-400-15 (GGG-40)		

23055324/FR – 05/2019

3.8 Important special numbers

Special number	Description
74	Double rotary shaft seal (for vacuum operation) Connection borehole G1/8 (for Quench)
158	Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" KF 16 - 25: Flange connection SAE 1"
197	Noise-optimized version for aerated oils (1)
198	Mechanical seal with Quench
232	Housing connection: KF 50 - 80: Flange connection SAE 2" KF 100 - 112: Flange connection SAE 2 1/2" KF 125 - 150: Flange connection SAE 3" KF 180 - 200: Flange connection SAE 3 1/2"
277	Vertical mounting position (shaft end above) Separate lubrication for rotating shaft seal (reduced pumping rate) (Size 4: on request)
304	Plastic plain bearings Iglidur® X (non-ferrous metal-free), Δp_{max} = 10 bar (Size 4: on request)
317	Noise-optimized version for aerated oils (1) **(197)** Plastic plain bearings Iglidur® X (non-ferrous metal-free), Δp_{max} = 10 bar **(304)**
322	Triple rotary shaft seal (for normal operation + for vacuum operation) Connection borehole G1/8 (for Quench) Plastic plain bearings Iglidur® X (non-ferrous metal-free), Δp_{max} = 10 bar **(304)** Housing connection: KF 32; 40: Flange connection SAE 1 1/2" **(Standard)** KF 50 - 80: Flange connection SAE 2" **(232)**
353	Noise-optimized version for aerated oils (1) **(197)** Multi layer friction bearings DP4 (lead free) (Size 4: on request)
359	Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" **(158)** KF 16 - 25: Flange connection SAE 1" **(158)** Noise-optimized version for aerated oils (1) **(197)**
363	Plastic plain bearings Iglidur® X (non-ferrous metal-free), Δp_{max} = 10 bar **(304)** Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" **(158)** KF 16 - 25: Flange connection SAE 1" **(158)**

23055324/FR – 05/2019

Special number	Description
391	Noise-optimized version for aerated oils [1] **(197)** Housing connection: KF 50 - 80: Flange connection SAE 2" **(232)** KF 100 - 112: Flange connection SAE 2 1/2" **(232)** KF 125 - 150: Flange connection SAE 3" **(232)** KF 180 - 200: Flange connection SAE 3 1/2" **(232)**
402	Double rotary shaft seal (for vacuum operation) **(74)** Connection borehole G1/8 (for Quench) **(74)** Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" **(158)** KF 16 - 25: Flange connection SAE 1" **(158)** KF 50 - 80: Flange connection SAE 2" **(232)** KF 100 - 112: Flange connection SAE 2 1/2" **(232)** KF 125 - 150: Flange connection SAE 3" **(232)** KF 180 - 200: Flange connection SAE 3 1/2" **(232)**
455	Noise-optimized version for aerated oils [1] **(197)** Vertical mounting position (shaft end above) Separate lubrication for rotating shaft seal (reduced pumping rate) **(277)**
459	Double rotary shaft seal (for vacuum operation) **(74)** Connection borehole G1/8 (for Quench) **(74)** Noise-optimized version for aerated oils [1] **(197)** Housing connection: KF 2.5 - 12: Flange connection SAE 3/4" **(158)** KF 16 - 25: Flange connection SAE 1" **(158)** KF 50 - 80: Flange connection SAE 2" **(232)** KF 100 - 112: Flange connection SAE 2 1/2" **(232)** KF 125 - 150: Flange connection SAE 3" **(232)** KF 180 - 200: Flange connection SAE 3 1/2" **(232)**

[1] *Measures for noise optimisation are only possible for one rotational direction and only effective for aerated oils or vacuum (only in connection with seal versions that are suitable for vacuum operation). Can lead to a reduction of delivery rate.*

23055324/FR – 05/2019

4 Technical data

4.1 General

General information KF 2.5 - 630			
Design		External gear pump	
Fixing type		Flange similar DIN ISO 3019 or Foot mounting	
End of drive shaft		ISO R 775 short-cylindrical	
Housing connection (1)		KF 2.5 - 12	Whitworth pipe thread G3/4
		KF 2.5 - 12 .. ./158	Flange connection SAE 3/4"
		KF 16 - 25	Whitworth pipe thread G1
		KF 16 - 25 .. ./158	Flange connection SAE 1"
		KF 32 - 80	Flange connection SAE 1 1/2"
		KF 50 - 80 .. ./232	Flange connection SAE 2"
		KF 100 - 112	
		KF 100 - 112 .. ./232	Flange connection SAE 2 1/2"
		KF 125 - 150	
		KF 125 - 150 .. ./232	Flange connection SAE 3"
		KF 180 - 200	
		KF 180 - 200 .. ./232	Flange connection SAE 3 1/2"
		KF 250 - 315	Flange connection SAE 3"
		KF 400 - 630	Flange connection SAE 4"
		KF 2.5 - 25 U	Suction connection: Whitworth pipe thread G3/4
			Pressure connection: Whitworth pipe thread G1/2
		KF 32 - 80 U	Suction connection: Flange connection SAE 2"
			Pressure connection: Flange connection SAE 2"
Mounting position		KF . R/L/B without fluid buffer	Any (2)
		KF . R/L/B with fluid buffer	Shaft end horizontal, fluid buffer connection top
		KF . U	Piston horizontal Pressure connection on top
External loads on shaft end		See section 4.2 “Overview nominal sizes”	
Speed	**n**	See section 4.2 “Overview nominal sizes” + section 4.3 “Viscosity - Rotation speed assignment”	

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General information KF 2.5 - 630		
Operating pressure	p_e p_b	See section 4.4 “Permissible pressure range”
Viscosity	v_{min}	See section 4.4.3 “Differential pressure - viscosity assignment”
	v_{max}	20000 mm^2/s
Fluid temperature	ϑ_m	See section 4.5 “Permissible temperature range”
Ambient temperature	ϑ_u	
Material		See section 4.6 “Material data”
Filtering		Filter porosity ≤ 60 µm
Permissible media		Lubricating fluids without abrasive components. (Petrols, solvents, etc. are not permissible.)
(1) *Pipe thread: ISO 228-1; Flange connection: ISO 6162-1 (SAE J518)* (2) *A reduced service life must be expected for the shaft seal in the case of vertical installation (shaft end top).*		

23055324/FR – 05/2019

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4.2 Overview nominal sizes

Nominal size V_{gn}	Geom. displacement V_g [cm³/rev.]	Speed n		Perm. radial force (1) F_{radial} [N] (n = 1500 rpm)	Permissible axial force F_{axial} [N] (n = 1500 rpm)	Sound pressure level (2) L_{pA} [dBA]	Mass inertia x10⁻⁶ J [kg m²]
		n_{min} [rpm]	n_{max} [rpm] (3)				
2,5	2.55	200	3600	700	-	≤ 67	14.0
4	4.03						15.9
5	5.05						17.8
6	6.38						20.5
8	8.05						24.0
10	10.11						28.4
12	12.58						33.7
16	16.09						42.3
20	20.1						50.8
25	25.1						61.7
32	32.12			1500		≤ 68	217
40	40.21						254
50	50.2						299
63	63.18						368
80	80.5		3000				443
100	101.5					≤ 69	741
112	113.5						806
125	129.4					≤ 65	1418
150	155.6						1637
180	186.6						1911
200	206.2		2500				2072
250	245.1		2000	2500		≤ 75	4133
315	312.9						5011
400	399.5					≤ 77	6618
500	496.5						7830
630	622.5					≤ 80	9591

(1) *Outside forces are only permissible in combination with an outboard bearing. F_{radial} on central shaft end.*
(2) *n = 1500 rpm ; v = 34 mm²/s ; p = 5 - 25 bar.*
(3) *Pay attention to the viscosity.*

23055324/FR – 05/2019

4.3 Viscosity - Rotation speed assignment

Kinematic viscosity v [mm²/s]									
100	200	300	500	1000	2000	3000	6000	10000	20000
3600	2900	2300	1800	1200	800	650	450	300	200
Recommended rpm n [rpm]									

☞ Select the speed of rotation so that complete filling of the pump is ensured. This is given if the pressure on the suction side does not fall below the permissible pressure $p_{e\ min.}$

23055324/FR – 05/2019

4.4 Permissible pressure range

4.4.1 Operating pressure of suction side and pressure side

Seal type (1)		Special number	Operating pressure (2)			
			Suction side		Pressure side	
			$p_{e\ min}$ [bar abs.] (3)	$p_{e\ max}$ [bar]	p_b [bar] (perm. continous pressure)	$p_{b\ max}$ [bar] (Pressure peaks)
1	**WDR (BABSL)**	-	0.6 (4)	See section 4.4.2 “Max. suction side operating pressure for sealing type 1, 2, 7 and 19”	25	40
2	**WDR (BABSL)**	-				
3	**WDR (HN2390)**	-		2		
4	**DRWDR (HN2390)**	-				
		74	0.1	0.2		
5	**GLRD (AX15)**	-	0.6 (4)	10		
6	**GLRD (AX30)**	-				
7	**DRWDR (BABSL)**	-		See section 4.4.2 “Max. suction side operating pressure for sealing type 1, 2, 7 and 19”		
		74	0.1	0.2		
9	**WDR (R02-R)**	-	0.6 (4)	0.5		
18	**WDR (BAUMX7)**	-				
19	**DRWDR (BABSL)**	-		See section 4.4.2 “Max. suction side operating pressure for sealing type 1, 2, 7 and 19”		
		74	0.1	0.2		

Seal type [1]		Special number	Operating pressure [2]			
			Suction side		Pressure side	
			$p_{e\ min}$ [bar abs.] [3]	$p_{e\ max}$ [bar]	p_b [bar] (perm. continous pressure)	$p_{b\ max}$ [bar] (Pressure peaks)
23	**WDR (MSS1)**	-	0.6 [4]	0.5	25 [5]	-
30	**-**	-		25	25	40
31	**WDR (BABSL)**	-		0.5	25 [5]	-
32	**DRWDR (R02-R)**	-		0.5	25	40
		74		0.2		
36	**-**	-		25		
40	**GLRD (L4)**	-		10		

[1] *WDR: Rotary shaft seal, DRWDR: Double rotary shaft seal, GLRD: Mechanical seal*
[2] *bar abs.: absolute pressure, bar: relative pressure*
[3] *KF . U: $p_{e\ min}$ = 0.65 bar abs.*
[4] *Start-up condition: 0.4 bar absolute (max. 30 minutes).*
[5] *ϑ_m < -20 °C: 16 bar (Housing material GJL).*

4.4.2 Max. suction side operating pressure for sealing type 1, 2, 7 and 19

Speed n [rpm]	$p_{e\ max}$ [bar]					
	KF 2.5 - 63	KF 80	KF 100 - 180	KF 200	KF 250 - 315	KF 400 - 630
≤ 750	6	6	6	6	5.5	5
≤ 1000	5	5	5	5	4.5	4
≤ 1500	4	4	3.5	3.5	3	2.5
≤ 2000	3	3	2.5	2.5	2	1.5
≤ 2500	2.5	2.5	2	2	-	-
≤ 3000	2	2	1.5	-	-	-
≤ 3600	1.5	-	-	-	-	-

23055324/FR – 05/2019

4.4.3 Differential pressure - viscosity assignment

Bearing	Δp_{max} [bar]		
	v ≥ 1.4 mm²/s	v ≥ 6 mm²/s	v ≥ 12 mm²/s
Multi layer friction bearings contains lead (Standard) DU, P10	3	12	25
Multi layer friction bearings lead free DP4			
Plastic plain bearings Iglidur® G; X; H370	-	6	10
White-metalled bearing TEGO® V738			

4.5 Permissible temperature range

Sealing material	Fluid temperature ϑ_m (1)	
	$\vartheta_{m\ min}$ [°C]	$\vartheta_{m\ max}$ [°C]
NBR	-20	90
PTFE / FEP with FKM-core		200
EPDM		120
FKM		150
FFKM / FEP with FKM-core		200
FKM (Low temperature)	-30	150

(1) *Comply with media-specific properties.*

Sealing material	Ambient temperature ϑ_u	
	$\vartheta_{u\ min.}$ [°C]	$\vartheta_{u\ max.}$ [°C]
NBR	-20	60
PTFE / FEP with FKM-core		
EPDM		
FKM		
FFKM / FEP with FKM-core		
FKM (Low temperature)	-30	

23055324/FR – 05/2019

4.6 Material data

Seal type [1]		Material				
		Shaft seal	O-rings	Housing/End cover	Gears	Bearing
1	WDR (BABSL)	NBR	NBR	EN-GJL-250 (GG-25) - - - EN-GJS-400-15 (GGG-40)	Case-hardened steel (1.7139)	Multi layer friction bearings contains lead (Standard) DU, P10 (Steel, CuSn, PTFE, Pb) - - - Plastic plain bearings non-ferrous metal-free Iglidur® X - - - Multi layer friction bearings lead free DP4 (Steel, CuSn, PTFE) - - - White-metalled bearing TEGO® V738 (Steel, Cu, Sn, Sb, Cd, Ni, As) (only KF 2.5 - 80)
2	WDR (BABSL)	FKM	FKM			
3	WDR (HN2390)	PTFE	FEP with FKM-core			
4	DRWDR (HN2390)	PTFE	FEP with FKM-core			
5	GLRD with FKM secondary seals (AX15)	C2S2V1G3G1 [2] (KF 2.5 - 200)	FKM			
		B10SV1G3G1 [3] (KF 250 - 630)				
6	GLRD with FFKM secondary seals (AX30)	Q2Q2K1G3 [4] (KF 2.5 - 25)	FEP with FKM-core			
		Q2B2K1G3 [5] (KF 32 - 200)				
7	DRWDR (BABSL)	FKM	FKM			
9	WDR (R02-R)	EPDM	EPDM			
18	WDR (BAUMX7)	FKM	FKM			
19	DRWDR (BABSL)	NBR	NBR			
23	WDR (MSS1)	FKM (Low temperature)	FKM (Low temperature)			

23055324/FR – 05/2019

Seal type (1)		Material				
		Shaft seal	O-rings	Housing/End cover	Gears	Bearing
30	**-**	-	FKM	EN-GJL-250 (GG-25) - - - EN-GJS-400-15 (GGG-40)	Case-hardened steel (1.7139)	Multi layer friction bearings contains lead (Standard) DU, P10 (Steel, CuSn, PTFE, Pb) - - - Plastic plain bearings non-ferrous metal-free Iglidur® X - - - Multi layer friction bearings lead free DP4 (Steel, CuSn, PTFE) - - - White-metalled bearing TEGO® V738 (Steel, Cu, Sn, Sb, Cd, Ni, As) (only KF 2.5 - 80)
31	**WDR (BABSL)**	FKM (Low temperature)	FKM (Low temperature)			
32	**DRWDR (R02-R)**	EPDM	EPDM			
36	**-**	-	NBR			
40	**GLRD with FKM secondary seals (L4)**	AQ2VFF (6)	FKM			

(1) *WDR: Rotary shaft seal, DRWDR: Double rotary shaft seal, GLRD: Mechanical seal*
(2) *Metal-impregnated carbon /CrMo-Steel, FKM, CrNiMo-Steel*
(3) *Resin-impregnated carbon , Cr-casting, FKM, CrNiMo-Steel*
(4) *SiC/SiC, FFKM, CrNiMo-Steel*
(5) *SiC/Resin-impregnated carbon , FFKM, CrNiMo-Steel*
(6) *Metal-impregnated carbon /SiC, FKM, CrNi-Steel*

23055324/FR – 05/2019

4.7 Weight

Nominal size V_{gn}	Gear pump [kg]			Added weight Mounting angle [kg]
	with end cover	with D - valve	with universal valve	
2.5	2.9 (KF . /158: +1.3)	3.7 (KF . /158: +1.3)	6.9	1.3
4				
5				
6				
8				
10				
12				
16	3.5 (KF . /158: +1.3)	4.3 (KF . /158: +1.3)	7.5	
20				
25				
32	7.7	9.5	27.5	1.6
40				
50				
63	9.4	11.2	29.5	
80				
100	16.0	18.7	-	3.3
112				
125	22.2	26.5		
150				
180	24.8	29.1		
200				
250	44.2	47.2		-
315				
400	54.7	57.9		
500				
630	60.8	64.0		

4.8 Dimensions

Dimensions of the device can be found in the relevant technical data sheets.

23055324/FR – 05/2019

5 Transport and storage

5.1 General

- After receipt, check the device for transport damages.
- If transport damage is noticed, report this immediately to the manufacturer and the carrier. The device must then be replaced or repaired.
- Dispose of packing material and used parts in accordance with the local stipulations.

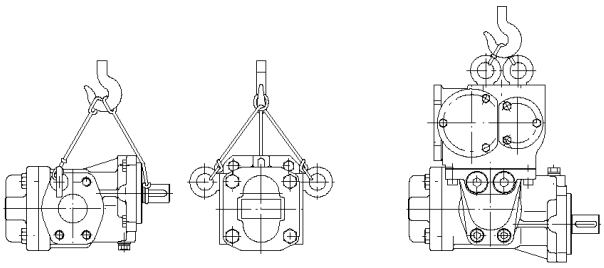
5.2 Transport

⚠ WARNING

Falling or overturning loads!
Danger of injury while transporting large and heavy loads.

1. Use only suitable means of conveyance and lifting tackle with sufficient load-bearing capacity.
2. Attach lifting tackle only to suitable load points.
3. Attach the lifting tackle in such a manner that it cannot slip.
4. Pay attention to the load balance point.
5. Always avoid jerks, impacts and strong vibrations during transportation.
6. Never walk under suspended loads, never work under suspended loads.

☞ To transport the device , eyebolts can be screwed into the flange connections.



5.3 Storage

The device's function is tested in the plant with mineral hydraulic oil. Then all connections are closed. The remaining residual oil preserves the interior parts for up to 6 months.

Metallic exposed exterior parts are protected against corrosion by suitable conservation measures, also up to 6 months.

In case of storage, a dry, dust-free and low-vibration environment is to be ensured. The device is to be protected against influences from weather, moisture and strong fluctuations of temperature. The recommended storage conditions are to be adhered to.

Below the permissible ambient temperature ϑ_u elastomer seals lose their elasticity and mechanical loading capacity, since the glass transition temperature is fallen below. This procedure is reversible. A force action on the device is to be avoided in case of storage below the permissible ambient temperature ϑ_u.

Devices with EPDM seals are not mineral-oil resistant and are not tested for their function. There is no preservation of the interior parts. If the device is not taken into operation immediately, all corrosion-prone surfaces are to be protected by suitable conservation measures. The same applies for devices which are not tested for other reasons.

When storing for a long period of time (> 6 months), treat all surfaces at risk of corrosion again with suitable preserving agents.

If high air humidity or aggressive atmospheres are expected, take additional corrosion-preventing measures.

Storage in corrosion protection bags (VCI) maximum of 6 months.

NOTICE

Corrosion/chemical impact

Improper storage can render the device useless.

1. Protect endangered surfaces by means of suitable conservation measures.
2. Comply with recommended storage conditions.

23055324/FR – 05/2019

☞

Recommended storage conditions

1. Storage temperature: 5 °C - 25 °C
2. Relative air humidity: < 70 %
3. Protect elastomer parts from light, especially direct sunlight.
4. Protect elastomer parts from oxygen and ozone.
5. Comply with maximum storage times of elastomeric parts:
   - 5 Years: AU (Polyurethane rubber)
   - 7 Years: NBR, HNBR, CR
   - 10 Years: EPM, EPDM, FEP/PTFE, FEPM, FKM, FFKM, VMQ, FVMQ

6 Installation

6.1 Safety instructions for installation

DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Take measures against accidental touching of rotating parts.

WARNING

Rotating parts!
Danger of injury from flying parts.
1. Enclose rotating parts so as to avoid any danger from flying parts in the event of breakage or malfunction.

WARNING

Unshielded gearwheels!
Gearwheels can trap and crush fingers and hands.
1. Do not engage gearwheels.

23055324/FR – 05/2019

⚠ WARNING
Failure of load-carrying parts due to overload! Danger of injury from flying parts. Danger of injury from spurting fluids. 1. Depressurise the device and all connection lines before doing any work. 2. Securely prevent the restoration of pressure while working on the device.

6.2 Noise reduction

☞ **Measures for noise reduction**

1. Use suction and pressure hoses.
2. Use bell housings with high damping properties (plastic or cast iron).
3. Use of damping rings and damping rods for separation of structure-borne noise.

6.3 Mechanical installation

6.3.1 Preparation

- Check the device for transport damage and dirt.
- Check the device for freedom of movement.
- Remove existing preservatives.
  - Use only those cleaning agents that are compatible with the materials used in the device.
  - Do not use cleaning wool.
- Compare the environmental and ambient conditions at the place of installation to the permissible conditions.
  - Ensure a sufficiently stable and level foundation.
  - Expose the device only to small vibrations, see IEC 60034-14.
  - Secure sufficient access for maintenance and repair.

6.3.2 Pumps with free shaft end

The prerequisite for trouble-free operation is suitable load transmission between the pump and the drive. By default a torsionally flexible claw coupling Type **"R"** is used for this.

- Pre-mount coupling parts as per manufacturer's specifications.

☞ Torsionally flexible claw coupling type **"R."**: See section 6.3.3 “Coupling Type "R.""

- Position the pumps and the drive with respect to each other.
  - Comply with the permissible mounting position.
  - Comply with the permissible direction of rotation.

☞ Rotation and delivery direction: See chapter 3 “Device description”

- Tighten all fastening screws with the specified torque.
  - Keep to the permissible displacement values of the coupling.
  - Rule out any distortion of the device.
  - Pay attention to sufficient screw-in depth of the fastening screws.

Tightening torques [Nm]							
Thread size (1)	**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Counter-thread Aluminium	4.6	11	22	39	95	184	315
Counter-thread Cast iron/Steel	10	25	49	85	210	425	730
(1) *Screws/Nuts with min. strength class 8.8/8*							

- For devices without shaft seals, ensure that the leak oil from the shaft sealing chamber is specifically drained off and cannot get into the environment.
- Make sure no foreign bodies can get into the device.
- Take measures against accidental touching of rotating parts.
- Take measures against accidental touching of hot surfaces (> 60 °C).
- On devices with quench, mount a tank for the liquid seal.
  - Mount the tank above the device.
  - The connection on the device must point upward.
  - Checking the fluid level must be possible at any time.

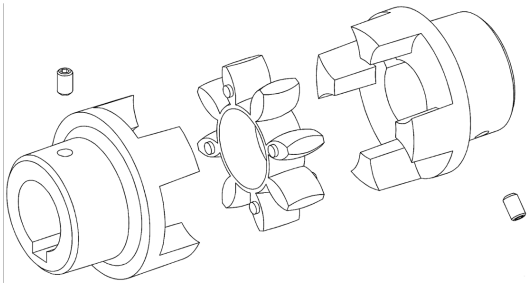
☞ A second port on the unit enables purging of the quench chamber and draining of the liquid seal.

23055324/FR – 05/2019

6.3.3 Coupling Type "R."

Claw couplings Type **"R."** are torsionally flexible and transmit the torque positive. They are fail-safe. The vibrations and impacts that occur during operation are effectively dampened and reduced.

Claw coupling Type "R."



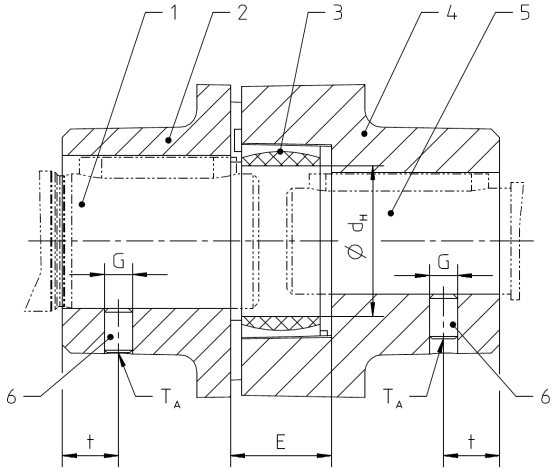
NOTICE

Coupling breakage or increased wear

An overload can lead to premature failure of the coupling.

1. Ensure safe dimensioning when designing the coupling. Take vibrations, torque peaks and temperatures into account.

Assembly data



Explanation

1. Shaft projects into spider
2. Coupling halve
3. Spider
4. Coupling halve
5. Shaft with parallel key projects into spider
6. Setscrew

When installing the coupling, maintain the "E" gap dimension so that the spider remains free during operation. If the shaft diameters are less than (also with parallel key) the dimension d_H of the spider, the shaft ends can protrude out into the spider.

Coupling size [(1)]	**14**	**19**	**24**	**28**	**38**	**42**	**48**	**55**	**65**	**75**
	-	**19/24**	**24/28**	**28/38**	**38/45**	**42/55**	**48/60**	**55/70**	**65/75**	**75/90**
Coupling clearance E [mm]	13	16	18	20	24	26	28	30	35	40
d_H [mm]	10	18	27	30	38	46	51	60	68	80
G	M4	M5	M5	M8	M8	M8	M8	M10	M10	M10
t [mm]	5	10	10	15	15	20	20	20	20	25
Tightening torque T_A [Nm]	1.5	2	2	10	10	10	10	17	17	17

[(1)] *Example: R.**19**-Z25/14-Z25/19 or R.**19/24**-Z25/14-Z25/24.*

23055324/FR – 05/2019

☞ For assembly, the coupling halves can be heated to approx. 80 °C and pushed onto the shaft ends while warm.

⚠ CAUTION
Hot surfaces! Burn injury to skin if touched. 1. Wear protective gloves at temperatures ≥48°C.

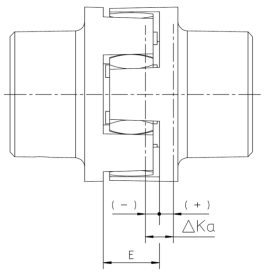
- Mount the coupling halves on the shaft ends but avoid impacts on the components.
- Position the coupling halves on the shaft ends so that in later operation the "E" gap dimension is maintained.
- Secure the coupling halves by tightening the setscrews.
- Insert the spider in a coupling half.

KRACHT

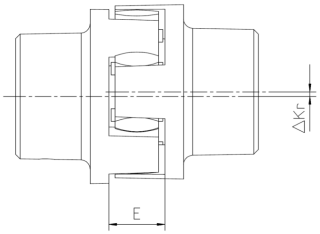
Gear pump KF 2.5 - 630

Displacement values

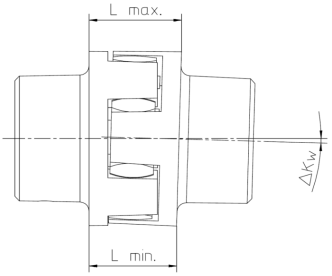
Axial displacement
ΔK_a



Radial displacement
ΔK_r



Angular displacement
$\Delta K_w/\Delta K_L$



$\Delta K_L \triangleq L_{max} - L_{min}$

Coupling size		14	19	24	28	38	42	48	55	65	75
		-	19/24	24/28	28/38	38/45	42/55	48/60	55/70	65/75	75/90
Coupling clearance E [mm]		13	16	18	20	24	26	28	30	35	40
ΔK_a [mm]		+1.0	+1.2	+1.4	+1.5	+1.8	+2.0	+2.1	+2.2	+2.6	+3.0
		-0.5	-0.5	-0.5	-0.7	-0.7	-1.0	-1.0	-1-0	-1.0	-1.5
ΔK_r [mm]	1500 rpm	0.11	0.13	0.15	0.18	0.21	0.23	0.25	0.27	0.30	0.34
	3000 rpm	0.08	0.09	0.1	0.13	0.15	0.16	0.18	0.19	0.21	0.24
ΔK_w [Degree]	1500 rpm	1.1	1.1	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.1
	3000 rpm	1.0	1.0	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0
ΔK_L [mm]	1500 rpm	0.57	0.77	0.77	0.90	1.25	1.40	1.80	2.00	2.50	3.00
	3000 rpm	0.52	0.7	0.67	0.80	1.00	1.30	1.60	1.80	2.20	2.70

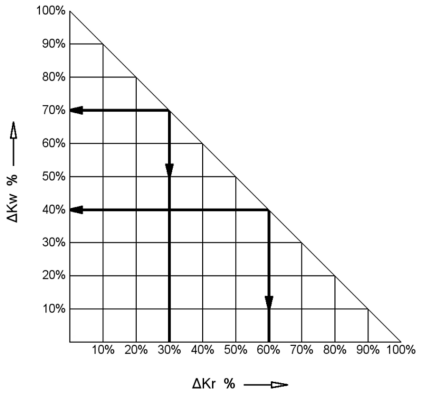
Displacement combinations

Examples for displacement combinations shown in the photo opposite:

Example 1:
ΔK_r = 30 %
ΔK_w = 70 %

Example 2:
ΔK_r = 60 %
ΔK_w = 40 %

$\Delta K_r + \Delta K_w \leq 100$ %



6.4 Connection lines

6.4.1 General

⚠ WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.

1. Use only connections and lines approved for the expected pressure range.
2. Securely prevent exceeding the permissible pressure, e.g. by using pressure relief valves or rupture discs.
3. Design pipework so that no tensions, e.g. caused by changes in length due to fluctuations in temperature, are transmitted to the device.

☞ **Additional connections**

1. Provide measurement connections for pressure and temperature as close as possible to device.
2. If necessary, provide a facility to fill or empty the device and the line system.
3. If necessary, provide a facility to vent the device and the line system.

6.4.2 Suction line

A less than optimally planned suction line can lead to increased noise emission, cavitation as well as reduction of the delivery rate (caused by not complete filling of the pump).

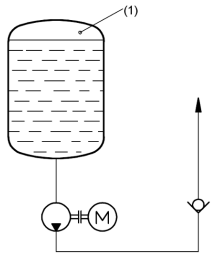
When designing the line, take the following points into consideration:

- The suction line must be piped as short as possible and in a straight line.
- Stipulate the nominal width of the suction line so that the permissible operating pressure $p_{e\,min}$ is not exceeded on the suction side.
- Avoid large suction heights.
- Avoid additional pressure loss through line resistances such as fittings, screwed connections, formed parts or suction filters/suction baskets.

  Ensure that all technically required suction filters/suction baskets are appropriately dimensioned.
- Make sure there is sufficient clearance of the suction port to the bottom and walls of the media container.
- Make sure that the suction opening lies underneath the lowest fluid level in all operating situations.
- When hose lines are used, ensure sufficient stability of the hoses so that they cannot become constricted through the sucking action.
- Comply with the recommended flow velocity in the suction line (max. 1.5 m/s).

Suction line at vacuum operation

If suction from a tank under vacuum is desired, the pump must be arranged approx. 1 m below the tank. The suction line must run in a straight line and without any resistances.
The tank may be subjected to vacuum only then when the pipework and the pump have been filled with liquid.
For this application, only pumps suitable for vacuum operation may be used.



(1) Vacuum

NOTICE

Cavitation damage

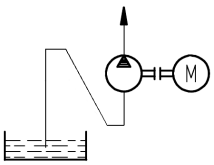
Undercutting the permissible suction port pressure results in cavitation.

1. Design the suction line so that the pressure arising in operation on the suction side is always higher than the vapour pressure of the pumped medium. At the same time, comply with the installation altitude of the device above mean sea level.
2. For aqueous fluids, mount the device underneath the fluid level, set the operating temperature to 50 °C and limit the speed to 1500 rpm.

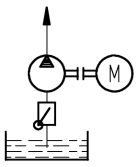
23055324/FR – 05/2019

Prevention of suction problems

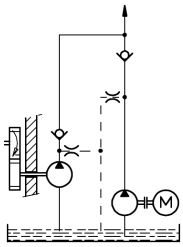
If there is a possibility that the suction line can run dry if the pump stops, piping the suction line as siphon is an option to avoid suction problems. This way, the pump will remain permanently filled after initial commissioning.



It is appropriate to employ a foot valve or a non-return valve in case of longer suction lines that can run dry while the pump is at rest. These must have been designed for use in suction lines and should offer as low a flow resistance as possible.



During operation of a pump that has to pump media via a non-return valve in a pressurized circuit (e.g. reserve pump in a lubricant circuit), suction problems can occur if the suction line is filled with air.
In this case the pressure pipe must be bled directly upstream of the non-return valve.
If no vent nozzle is used, the volume of the pressure pipe between the pump and the non-return valve must be at least 75 % of the suction line volume.



6.4.3 Pressure line

When designing the line, take the following points into consideration:

- Select the nominal width of the pressure line so that the maximum permissible pressures are not exceeded.
- If necessary, provide a vent nozzle to prevent suction problems.

6.4.4 Mounting Connection lines

☞ Position of the device connections: See chapter 3 “Device description”

- Clean all lines.
  - Do not use cleaning wool.
  - Pickle and flush welded pipes.
- Remove the protective plugs.
- Mount the lines.
  - Comply with the manufacturer's information.
  - Do not use any sealing materials such as hemp, Teflon tape or putty.

6.5 Change of the direction of rotation

For pump types KF . R and KF . L, a change of the direction of rotation is only possible by converting.

The manufacturer normally carries out the conversion work and the customer should do this only in exceptional cases. Please consult the manufacturer about this.

Gear pumps in noise-optimized version cannot be converted. (e.g. special number **197**)

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.

1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.

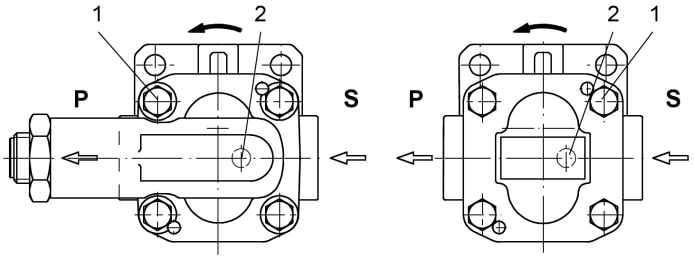
1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

NOTICE

Leaks or increased wear
Damaged sealing surfaces or supports lead to lack of sealing and/or faults in later operation.

1. When assembling or disassembling housing components, be sure not to damage the bearings, e.g. by tilting.
2. When disassembling housing components, do not use screwdrivers or the like as a lever to separate the joints.
3. Do not remove, damage or jam seals.

23055324/FR – 05/2019



S = Suction connection
P = Pressure connection

1. Fastening screws
2. Leak oil hole

To change the direction of rotation of the gear pump, turn the end cover or the pressure relief valve 180°.

- Loose fastening screws.
- Unscrew the end cover or the pressure relief valve of the pump housing and replace it rotated 180°.
- Tighten the fastening screws with the stated torque.

Fastening screws KF 2.5 - 630				
Gear pump	**KF 2.5 - 25**	**KF 32 - 80**	**KF 100 - 200**	**KF 250 - 630**
Tightening torques [Nm]	25	49	85	215

For pumps with sealing type 6, the lip-type seal must be replaced in addition. During this process, the spring coiling direction must be observed.

When checking, pay attention to the following points:

1. For gear pumps without pressure relief valve, the leak oil hole in the end cover must be placed at the pump's suction side.
2. Gear pumps with pressure relief valve must have their pressure relief valve adjusting screw point toward the pump's pressure side.

7 Operation start-up

7.1 Safety instructions for start-up

DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Do not operate the device against closed shut-off devices.
2. Do not operate the device in the false direction of rotation.

CAUTION

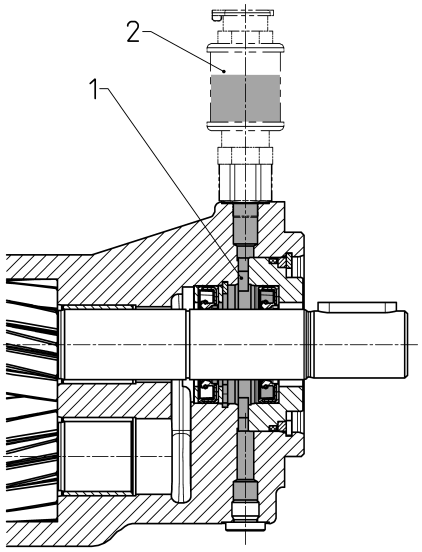
Hot surfaces!
Burn injury to skin if touched.
1. Wear protective gloves at temperatures ≥48°C.

7.2 Preparation

- Before starting the system make sure that a sufficient quantity of the operating fluid is extant to avoid dry running.
  Take this into consideration especially with high output volumes.
- Check all fastening screws on the device.
- Fill pump and the suction line with medium.

23055324/FR – 05/2019

7.3 Filling the quench chamber



1. Quench chamber
2. Container for quench-liquid (Accessories)

- For versions with quench, fill the quench chamber with a suitable quench liquid.
  - The filling is implemented through the tank provided for that.
  - Fill fluid until the quench chamber is completely full and the tank is half full.
- Do not apply pressure or vacuum to the quench chamber.

NOTICE

Seal failure due to dry run

A lack of quench liquid can lead to a failure of the seal.

1. Do not put pumps without quench liquid into operation.

☞ A second port on the unit enables purging of the quench chamber and draining of the liquid seal.

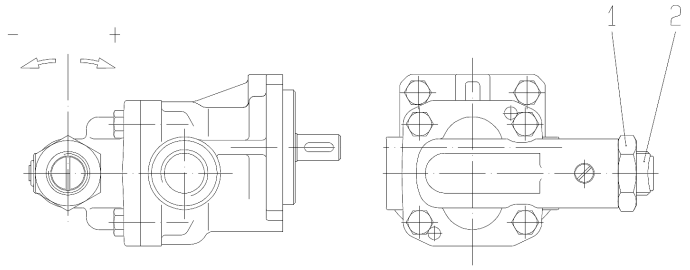
7.4 Pressure relief valve adjustment

Directly attached pressure relief valves of the series "D" are used exclusively for protection of the gear pumps and may respond on a short-term basis only.

The valves are factory set to the rated pressure of each pressure stage. Setting pressures that deviate from this are stated on the rating plate.

NOTICE

Failure of the pump
Long triggering of the valve can cause the pump to overheat.
1. Only allow intermittent triggering of the valve.



- *Lower response pressure*
+ *Higher response pressure*

1. Hexagonal nut
2. Adjustment screw

Pressure setting:

- Remove hexagon nut
- Set the response pressure using the adjusting screw
- Secure the adjusting screw with hexagon nut

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Consider the permissible pressure setting range of the valve.
2. Check the pressure setting (the valve must not block).

23055324/FR – 05/2019

7.5 Further operation start-up

- Open existing shut-off elements upstream and downstream of the device.
- Adjust pressure relief valves in the system installed for lowest opening pressure.
- Allow the device start without or with a low pressure load (jog mode).
  - Flow should have developed after 30 s at the latest.
- Run the device for a few minutes depressurised or with low pressure.
- Vent the system at the highest possible point.
- Gradually increase the pressure load up to the desired operating pressure.
- Operate the system for so long until the final operating state is achieved.
- Check the operating data such as:
  - Discharge flow
  - Operating pressure (as close as possible to device)
  - Fluid temperature (as close as possible to device)
  - Device temperature (in particular in the area of the bearing points)
  - ...
- Document the operating data of the initial start-up for later comparison.
- Check the level of the operating medium in the system.
- Check the filling level of the liquid seal (if existing).
- Check the device for leaks.
- Check all threaded connections for leaks and retighten if necessary.

☞ In order to ensure a constant and reliable function of the device, an initial maintenance of the device is recommended after several hours warm-up time (max. 24 h). Faults can thus be identified at an early stage.

23055324/FR – 05/2019

8 Removal

8.1 Safety instructions for removal

DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

WARNING

Unshielded gearwheels!
Gearwheels can trap and crush fingers and hands.
1. Do not engage gearwheels.

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

CAUTION

Hot surfaces!
Burn injury to skin if touched.
1. At temperatures ≥48°C the device must be allowed to cool down first.

23055324/FR – 05/2019

NOTICE

Blocking of the device through hardening medium

Hardening medium can mechanically jam the device and make it unusable.

1. Clean device immediately after operting with a hardening medium.

8.2 Removal

- Depressurise and de-energize the system.
- Close existing shut-off elements upstream and downstream of the device.
- Open existing drain elements and loosen connection lines. Collect and dispose of discharging medium so that no hazard arises for persons or environment.
- Dismantle the device.
- Clean the device.
- Close the device connections and lines to prevent dirt penetration.

23055324/FR – 05/2019

9 Maintenance

9.1 Safety instructions for maintenance

⚠ DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

⚠ DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

⚠ WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

⚠ CAUTION

Hot surfaces!
Burn injury to skin if touched.
1. At temperatures ≥48°C the device must be allowed to cool down first.

9.2 Maintenance work

☞ **Checking and documentation of the operating data**
Regular checking and documentation of all operating data such as pressure, temperature, current consumption, degree of filter soiling, etc. contributes to early problem detection.

23055324/FR – 05/2019

- Perform maintenance according to specification.
- Replace defective and worn components.
- If required, request spare parts lists and assembly drawings from the manufacturer.
- Document the type and scope of the maintenance work along with the operating data.
- Compare the operating data with the values of the first commissioning.
  Determine the cause in case of major non-compliances (> 10 %).
- Dispose of packing material and used parts in accordance with the local stipulations.

Barriers and instructions
All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

9.3 Maintenance instructions

The following information provides recommendations on maintenance work and maintenance intervals for the device being used.

Depending on the actually occurring loads in operation, the type, scope and interval of the maintenance work can deviate from the recommendations. The equipment builder/operator shall write an obligatory maintenance plan.

Within the framework of preventive maintenance, it is appropriate to replace wear parts before reaching the wear limit.

With corresponding expertise and sufficient equipment, the replacement can be carried out by the equipment builder/operator. Please consult the manufacturer about this.

Warranty
In case of improper implementation, any warranty is voided.

Maintenance recommendations Gear pump			
Interval	**Maintenance work**	**Employees**	**Duration approx. [h]**
Firstly: after max. 24 h	Inspection: Discharge flow	1	1
	Inspection: Operating pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Add-on valve function (if existing)		
	Inspection: Check potential equalisation for firm seating and functionality (if existing)		
	Inspection: Condition of operating fluid		
Daily	Audiometric monitoring: Unusual noise	1	0.1
	Cleaning: Remove dust deposits and dirt with a moist cloth		
	Visual inspection: Leakages		
	Visual inspection: Filling level of liquid seal (if existing)		
3000 Operating hours	Inspection: Discharge flow	1	1
	Inspection: Operating pressure		
	Inspection: Fluid temperature		
	Inspection: Device temperature		
	Inspection: Add-on valve function (if existing)		
	Inspection: Check potential equalisation for firm seating and functionality (if existing)		
	Inspection: Condition of operating fluid		
6000 Operating hours	Visual inspection: Condition of gears	1	2
	Visual inspection: Condition of housing parts		
	Visual inspection: Condition of plain bearings		
	Visual inspection: Condition of shaft seal		
	Visual inspection: Condition of outboard bearings (if existing)		
As required	Replace: Plain bearings (only by manufacturer)	1	2
	Replace: Outbord bearing (if existing)		
	Replace: Shaft seal		
	Replace: Other seals		

23055324/FR – 05/2019

10 Repairs

10.1 Safety instructions for repair

DANGER

Hazardous fluids!
Danger of death when handling hazardous fluids.
1. Comply with the safety data sheets and regulations on handling hazardous fluids.
2. Collect and dispose of hazardous fluids so that no hazards arise for people or the environment.

DANGER

Rotating parts!
Danger of death due to body parts, hair or clothing getting trapped or entangled.
1. Before all work, ensure that existing drives are voltage-free and pressure-free.
2. Securely prevent restarting during all work.

WARNING

Failure of load-carrying parts due to overload!
Danger of injury from flying parts.
Danger of injury from spurting fluids.
1. Depressurise the device and all connection lines before doing any work.
2. Securely prevent the restoration of pressure while working on the device.

CAUTION

Hot surfaces!
Burn injury to skin if touched.
1. At temperatures ≥48°C the device must be allowed to cool down first.

10.2 General

The repairs covers:

1. Troubleshooting
   Determination of damage, pinpointing and localisation of the damage cause.
2. Elimination of damage
   Elimination of the primary causes and replacement or repair of defective components. The repair is generally made by the manufacturer.

Repairs by manufacturer

- Before returning the device, fill in the *return notification* form. The form can be filled in online and is available as a pdf file download.

Device contains hazardous material
If the device was operated with dangerous liquids, it must be cleaned before the return. If this should not be possible, the safety data sheet of the hazardous material is to be provided beforehand.

Repair by equipment builder/operator

If corresponding expertise and sufficient equipment is available, the equipment builder/operator can also make the repairs. Please consult the manufacturer about this.

- If required, request spare parts lists and assembly drawings from the manufacturer.
- Use spare parts approved by the manufacturer only.
- Dispose of packing material and used parts in accordance with the local stipulations.

Warranty
In case of improper implementation, any warranty is voided.

Barriers and instructions
All barriers and warning signs removed during this must be attached to their original position on completing maintenance and/or repairs.

23055324/FR – 05/2019

10.3 Detecting and eliminating failures

Failure		Potential causes	Possible measures
1.1	**Increased noise** *Pump cavitation*	Excessive negative pressure (not complete filling of the pump)	Check suction line design
			Use noise-optimised pump
		Suction line plugged	Clean the suction line
		Suction filter plugged or too small	Clean suction filter or use a larger filter
			Replace filter element
		Suction bascet plugged or too small	Clean intake strainer or dimension larger
		Fluid temperature too low	Adjust the temperature of medium
1.2	**Increased noise** *Foaming or air in medium*	Pump sucks air	Check oil level in the tank
			Check suction line
			Check the shaft seal
		Shaft seal defective	Replace shaft seal
		Suction connection leaking	Retighten or replace threaded connections
			Replace seals
		System not vented	Vent system
		Return line ends above the fluid level	Extend return line
		Heavy foaming in the system, e.g. in gears	Use noise-optimised pump
1.3	**Increased noise** *Mechanical vibrations*	Incorrectly aligned and/or loose coupling	Correct the alignment of the coupling and secure the coupling halves
		Incorrectly and/or insufficient line fastening	Fixate lines with suitable fastening material (e.g. pipe clamps)
		Wobbling pressure relief valve (if existing)	Increase valve opening pressure
		Not a noise-reducing setup	Use dampers

23055324/FR – 05/2019

Failure		Potential causes	Possible measures
2	**Pump does not suck**	Dry run	Fill pump and the suction line with medium.
		Minimum filling level in the supply tank undercut	Top up medium
		False direction of rotation of the pump	Correct the direction of rotation
		Closed shut-off element in the suction line	Open the shut-off element
		Suction line plugged	Clean the suction line
		The air in the suction line cannot be compressed in the pressure line	Reduce the start-up pressure
			Vent the pressure line
			Increase volume of the pressure line
		Speed of the pump is too low	Check the pump design
			During frequency inverter operation: Check the operation/line frequency
		Geodetic suction head too high	Check installation location
			Provide pre-filling pump

Failure		Potential causes	Possible measures
3	**Insufficient pressure Insufficient pumping flow rate**	Excessive negative pressure (not complete filling of the pump)	Check suction line design
		Viscosity too high	Provide pre-filling pump
		Speed of the pump is too low	Check the pump design
			During frequency inverter operation: Check the operation/line frequency
		Throttled shut-off element in the suction line	Open the shut-off element
		Suction line plugged	Clean the suction line
		Suction filter plugged or too small	Clean suction filter or use a larger filter
			Replace filter element
		Suction bascet plugged or too small	Clean intake strainer or dimension larger
		Constant triggering of pressure relief valve (if existing)	Increase valve opening pressure
		Pump sucks air	Check oil level in the tank
			Check suction line
			Check the shaft seal
		Wear	Replace the device
4	**Excessive operating temperature**	Cooling and heat dissipation insufficient	Increase the cooling capacity
		Not sufficient oil in the system	Check the container layout
		Excess fluid is being delivered into the supply tank via pressure relief valve under load	Check the pump design
5	**Impermissible pump heating**	Constant triggering of a directly attached pressure relief valve (if existing)	Increase valve opening pressure
		Pressure too high in association with a media viscosity that is too low	Check the system design
		Speed too fast in connection with media viscosity that is too high	Check the system design
		Gland lid overtightened (for gland seal)	Unscrew gland lid and readjust leakage
		Suction pressure too high	Reduce the pressure
		Wear	Replace the device

Failure		Potential causes	Possible measures
6	**Leakages** *Seal failure*	Poor maintenance	Comply with maintenance plan Replace seals
		Mechanical damage	Replace seals
		Thermal overload	Check the operating datas Replace seals
		Pressure too high	Check the operating datas Replace seals
		Gas content in medium too high	Check the operating datas Replace seals
		Corrosion/chemical impact	Check the material compatibility Replace seals
		Wrong direction of rotation	Correct the direction of rotation Replace seals
		Contaminated medium	Provide filtration Replace seals
		Gland lid not sufficiently tightened (for gland seal)	Retighten gland lid
		Loose threaded connections	Retighten or replace threaded connections
7.1	**Coupling** *Coupling wear*	Alignment error	Correct the alignment of the coupling and secure the coupling halves
		Spider overloaded	Check the operating datas Use harder spider
7.2	**Coupling** *Cam break*	Spider wear Torque transmission due to metal contact	Adapt maintenance intervals Replace coupling
7.3	**Coupling** *Premature spider wear*	Alignment error	Correct the alignment of the coupling and secure the coupling halves Replace spider
		Spider failure due to chemical corrosion	Check the material compatibility Replace spider

23055324/FR – 05/2019

Failure		Potential causes	Possible measures
8	**Motor protection switch tripped**	Driving power too low	Check the drive design
		Motor incorrectly connected	Check motor connection
		Phase failure	Check feed/supply
		Current consumption too high	Check the operating datas
			Check direction of rotation
		Motor circuit breaker incorrectly designed	Check the operating datas
Consult the manufacturer for all unidentifiable failures.			

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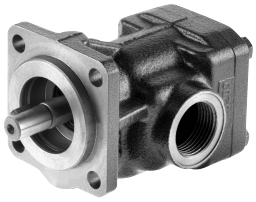

Transfer Gear Pumps

KF 2.5...200

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200 KRACHT

Transfer Gear Pumps KF 2.5...200

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Contents

Technical Data

Dimension Sheets

KRACHT GmbH · Gewerbestr. 20 · 58791 Werdohl, Germany · *fon* +49 (0) 23 92 / 935-0 · *fax* +49 (0) 23 92 / 935 209 · *mail* info@kracht.eu · *web* www.kracht.eu

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Transfer Gear Pumps KF 2.5...200

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Applications, Suitable Fluids

Applications

Centrifuge construction,
Coating machines, Compressors

Engine construction

Filling stations, Filter systems

Generator construction

Heat transfer systems, Heavy electrical machines

Lubricant manufacturers, Lubricating oil systems

Machine-building industry, Machine tools,
Manufacture of apparatus,
Marine engine construction,
Metal-forming machines, Metering systems

Paint industry, Plain metal bearing production,
Printing machines, PUR machinery

Refrigerators, Rubber and tire manufacturing

Tank plant construction,
Transmission building
Turbine construction

Vacuum machinery

Waste oil - disposal
- transport
- treatment

Suitable fluids

Adhesives, Antifreeze

Bore oils

Cutting oils

Diesel oils, Drawing compound

Emulsions

Fuel oils, L, EL, H

Gear oils, Grease

Hardening oils, Heat transfer media,
Heavy oils, Hydraulic fluids

Isocyanate

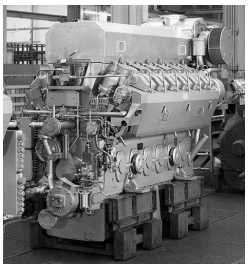
Lubricating oils, Lacquers

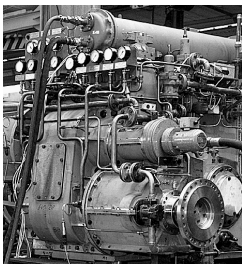
Motor oils

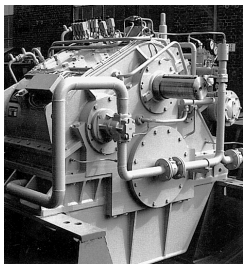
Paint, Paraffins, Plastics, Polyols
Printing inks, Processing oils

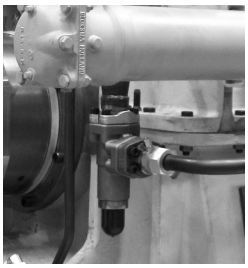
Resins, Rolling oils

Waste oils, Waxes









23055324/FR – 05/2019

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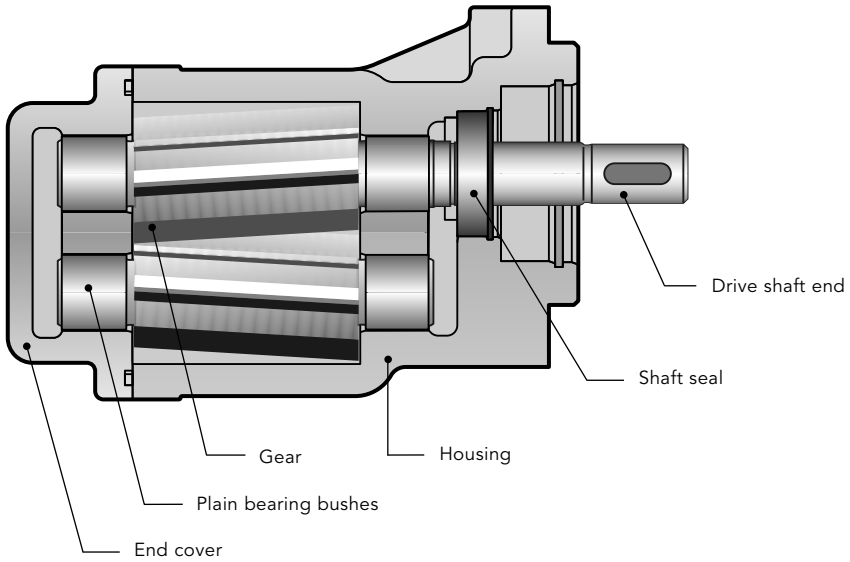
Construction



Product Features

Transfer gear pumps KF are used for pumping a wide variety of fluids.

Transfer gear pumps KF are distinguished especially by their wide range of variants which are assembled as required on the modular principle and also permit subsequent upgrade.

The pumps are also suitable for media with low lubricating properties.

The standard housing sections are of grey cast iron.

The gear units are manufactured from high-strength case-hardening steel, hardened and mounted in special multi-compound plain bearing bushes.

The standard drive shaft is sealed by rotary shaft lip-type seal.

All pump sizes incorporate helical tooth system. This feature, combined with special gear geometry, results in extremely low noise levels and reduced pressure pulsation.

Working Notes

- The fluids should ensure a certain minimum lubricating properties, should not contain solids and should be chemically compatible.
- Avoid dry operation.
- The pumps may only be operated in the specified direction of rotation, as otherwise the shaft seal will be destroyed.
- In order to prevent excessive overpressure, a safety valve should be provided in the system or on the pump.
- The pressure relief valve attached to the pump may only be used as safety valve for short-term operation.
- A separate pressure relief valve with return line to the reservoir must be foreseen, if a partial discharge flow has to be drained over a prolonged period.

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23055324/FR – 05/2019

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Transfer Gear Pumps KF 2.5...200

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Variants

- Sealing of the drive shaft:
  - Rotary shaft lip-type seal
  - Double rotary shaft lip-type seal (Quench)
  - Mechanical seal
- Outboard bearing to take up input drive-side radial load
- Pressure relief valve for pump and system
- Uniform discharge flow direction with changing direction of rotation by means of flange-mounting valve combination (universal device).

Special Design

Various shafts ends and gear units, as well as flange mounted versions, bearing alternatives, multi-stage pump combinations for your special application are available on request.

Our Sales engineers will be pleased to advise you.

Accessories

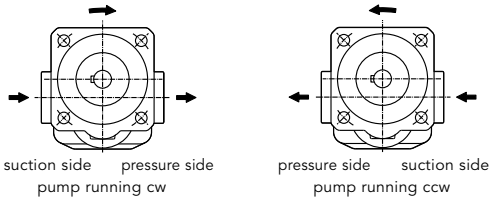
- Connecting flanges
- Couplings
- Bell housing
- Quench tank
- Attenuation elements

Direction of Rotation

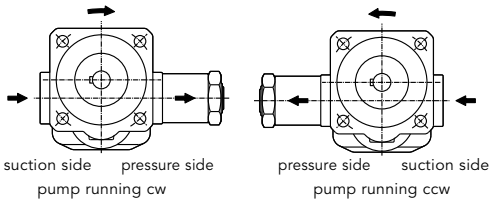
The following should be note for direction of rotation:

- when looking at the pump shaft end, the direction of pumping is from left to right if the shaft rotates **clockwise**.
- when looking at the pump shaft end, the direction of pumping is from right to left if the shaft rotates **counterclockwise**.

Without pressure relief valve



With pressure relief valve



With universal device

Direction of rotation right and left

Direction of rotation consistent,see dimension sheets page 18 to 21.

ATEX-Version

	KF 2,5...112 with lip-type seal	KF 2,5...112 with double lip-type seal
In Ex-area max. suitable for category	EX II 2G T4 EX II 2D T135 °C	EX II 2G T4
Perm. working pressure inlet port in bar	– 0.4 ... + 0.5	– 0.4 ... + 0.5
Perm. working pressure outlet port in bar	25	25
Perm. viscosity in mm^2/s	12 ... 20 000	12 ... 20 000
Max. speed in 1/min (viscosity dependent))	3 000	3 000
Perm. mounting position	Horizontal or shaft end toward bottom	Horizontal quencher up
Perm. media temperatures in °C	– 10 ... + 80	– 10 ... + 80
Perm. ambient temperatures in °C	– 20 ... + 60	– 20 ... + 60
Comments	Vertical mounting with shaft end up on request. In executing with outboard bearing max. speed 1500 1/min. In dust Ex-area, permissible only with non-conductive dusts. Dust-proof capsuling of pump shaft and coupling required.	Not suitable for dust-Ex. Execution with quench feed and quencher.

Additional products available on request.

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

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Materials

Housing and cover	EN-GJL-250 (GG 25) EN-GJS-400-15 (GGG 40) on request
Gear	Steel 1.7139
Plain bearing bushes	DU (multi-layer friction-type bearings P 10, DP 4) Bearings free of nonferrous metal on request
Shaft end seals	NBR, FKM, PTFE, EPDM (other sealing materials on request. E.g. HNBR / CR)
O-ring	NBR, FKM, PTFE, EPDM (other sealing materials on request. E.g. HNBR / CR)

Characteristics

Nominal sizes 2.5...200 cm^3	V_g =	2.5 / 4 / 5 / 6 / 8 / 10 / 12 / 16 / 20 / 25 / 32 / 40 / 50 / 63 / 80 / 100 / 112 / 125 / 150 / 180 / 200
Mounting position		KF... R/L/B ... without Quench optional KF... R/L/B ... with Quench horizontal, Quench connection above KF... U ... horizontal, Pressure connection above KF... U2...optional
Direction of rotation		right **or** left right **and** left
Fixing type		flange
Pipe connection	KF 2.5...25 KF 32...200	Whitworth pipe thread, SAE flange SAE flange
Drive shaft end		ISO R 775 short-cylindrical
Working pressure suction side		see chart page 8
Working pressure pressure side	P_n	25 bar (higher pressures on request)
Speed	KF 2.5... 63 KF 80... 180 KF 200	200 ... 3 600 1/min 200 ... 3 000 1/min 200 ... 2 500 1/min
Recommended speed	The speed of the pump must be chosen in such a way that complete pump filling is guaranteed. This is given if the relative pressure at the pump inlet does not fall below -0.4 bar (-0.6 bar briefly e.g. during cold start).	
Viscosity (dependent on pressure and rotational speed)	V_{min} V_{max}	1.4... 12 mm^2/s (see table "permissible differential pressure") 20 000 mm^2/s
Fluid temperature		see chart page 8
Ambient temperature	ϑ_u =	– 20 °C ... 60 °C (– 4 °F ... 140 °F) – 30 °C... 60 °C Sealing type 23 (KF 2.5...80) – 30 °C... 60 °C Sealing type 31 (KF 32...200)

Permissible Differential Pressure

Bearing	Δp_{max} [bar]		
	≥ 1.4 mm^2/s	≥ 6 mm^2/s	≥ 12 mm^2/s
Multi-layer plain bearing containing lead (1): DU®, P10	3	12	25
Multi-layer plain bearing lead-free (2): DP4			
Polymer plain bearing (2): Iglidur® X	–	3	10
White metal plain bearing (2)			

(1) Standard (2) Is defined in the special number

23055324/FR – 05/2019

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Transfer Gear Pumps KF 2.5...200

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Shaft End Seals

	Sealing material	Pressure suction side* (bar) KF 2,5...80	KF 100...200	Fluid temperature °C	°F
Pump with single rotary shaft lip	NBR/ FKM max. 750 1/min	– 0.4...6.0	– 0.4...6.0	– 10...90-NBR	14...194-NBR
	max. 1000 1/min	– 0.4...5.0	– 0.4...5.0		
	max. 1500 1/min	– 0.4...4.0	– 0.4...3.5	– 10...150-FKM	14...302-FKM
	max. 2000 1/min	– 0.4...3.0	– 0.4...2.5		
	max. 3000 1/min	– 0.4...2.0	– 0.4...1.5		
	FKM (low temperature)	– 0.4...0.5		– 30**...150	– 22**...302
	EPDM	– 0.4...0.5		– 10...120	14...248
	PTFE	– 0.4...2.0		– 10...200	14...392
Pump with outboard bearing and single rotary shaft lip	NBR/ FKM max. 750 1/min	– 0.4...6.0	– 0.4...6.0	– 10...90-NBR	14...194-NBR
	max. 1000 1/min	– 0.4...5.0	– 0.4...5.0		
	max. 1500 1/min	– 0.4...4.0	– 0.4...3.5	– 10...150-FKM	14...302-FKM
	max. 2000 1/min	– 0.4...3.0	– 0.4...5.5		
	max. 3000 1/min	– 0.4...2.0	– 0.4...1.5		
	PTFE	– 0.4...2.0		– 10...200	14...392
Pump with double rotary shaft seal with connection borehole for liquid seal (quench)	NBR/ FKM max. 750 1/min	– 0.4...6.0	– 0.4...6.0	– 10...90-NBR	14...194-NBR
	max. 1000 1/min	– 0.4...5.0	– 0.4...5.0		
	max. 1500 1/min	– 0.4...4.0	– 0.4...3.5	– 10...150-FKM	14...302-FKM
	max. 2000 1/min	– 0.4...3.0	– 0.4...2.5		
	max. 3000 1/min	– 0.4...2.0	– 0.4...1.5		
	PTFE	– 0.4...2.0		– 10...200	14...392
Pump with double rotary shaft seal for vacuum operation with connection borehole for liquid seal (quench)	NBR	– 0.9...0.2		– 10...90	14...194
	FKM	– 0.9...0.2		– 10...150	14...302
	PTFE	– 0.9...0.2		– 10...200	14...392
Pump with triple rotary shaft seal for vacuum and normal operation with connection borehole for liquid seal (quench)	NBR/ FKM max. 750 1/min	– 0.9...6.0	– 0.9...6.0	– 10...90-NBR	14...194-NBR
	max. 1000 1/min	– 0.9...5.0	– 0.9...5.0		
	max. 1500 1/min	– 0.9...4.0	– 0.9...3.5	– 10...150-FKM	14...302-FKM
	max. 2000 1/min	– 0.9...3.0	– 0.9...2.5		
	max. 3000 1/min	– 0.9...2.0	– 0.9...1.5		
Pump with mechanical seal	FKM	– 0.4...10.0		– 10...150	14...302
	PTFE	– 0.4...10.0		– 10...200	14...392
	EPDM	– 0.4...10.0		– 10...120	14...248
Pump with mechanical seal and connection borehole for liquid seal (quench)	FKM	– 0.4...10.0		– 10...150	14...302

Speed: KF 2.5... 63 200 ... 3 600 1/min
KF 80... 180 200 ... 3 000 1/min
KF 200 200 ... 2 500 1/min

The indicated maximum values are dependent upon the remaining working conditions.

In case of universal devices, pay attention to limitation of $P_{e\ min.}$

Other sealing materials on request.

* short term during start-up status: – 0.6 bar

** only in connection with housing and cover material EN-GJS-400 (GGG 40)

Transfer Gear Pumps KF 2.5...200

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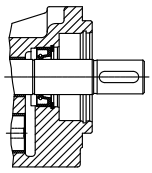
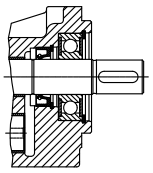
Variants Shaft End Seals



Pump with single rotary shaft lip

Fixing type: F/W

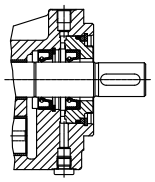
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
PTFE = sealing type 3
EPDM = sealing type 9
FKM low temperature
= sealing type 23/31



Pump with outboard bearing and single rotary shaft lip

Fixing type: G/X

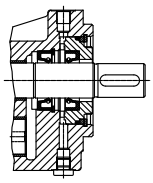
Sealing materials:
NBR = sealing type 1
FKM = sealing type 2
PTFE = sealing type 3



Pump with double rotary shaft seal with connection borehole for liquid seal (quench)

Fixing type: F/W

Sealing materials:
NBR = sealing type 19
FKM = sealing type 7
PTFE = sealing type 4
EPDM = sealing type 32

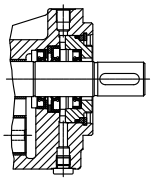


Pump with double rotary shaft seal for vacuum operation with connection borehole for liquid seal (quench)

Fixing type: F/W

Sealing materials:
NBR = sealing type 19
FKM = sealing type 7
PTFE = sealing type 4
EPDM = sealing type 32

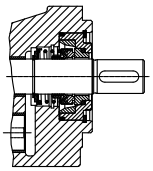
Special number: 74



Pump with triple rotary shaft seal for vacuum and normal operation with connection borehole for liquid seal (quench)

Fixing type: F/W

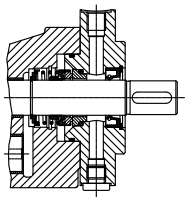
Sealing materials:
NBR = on request
FKM = on request



Pump with mechanical seal

Fixing type: F/W

Sealing materials:
FKM = sealing type 5
PTFE = sealing type 6
mechanical seal
= sealing type 40

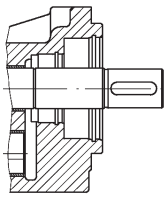


Pump with mechanical seal and connection borehole for liquid seal (quench)

Fixing type: F/W

Sealing materials:
FKM = sealing type 5

Special number: 198



Pump without shaft sealing

Fixing type: F/W

Sealing material:
FKM o-ring
= sealing type 30

Transfer Gear Pumps KF 2.5...200

KRACHT

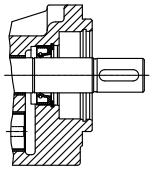
KF 2.5...200 noise optimized for medias with increased air content

The noise optimized pumps in the KF series are designed for conveying for medias with increased air content, predominantly for use as lubricating oil pumps in transmissions. Special measures prevent the otherwise normally increased noise present in auriferous transmission oil. The noise levels do not exceed or only barely exceed the measurements with non-auriferous oils. Also, there is no noise spectrum shift to higher, unpleasant frequencies. In applications without auriferous portions in the media, it is not recommended to use this version as it will not bring about noise reduction effects there.

The noise optimized version of the KF pump is marked with the special number **197** at the end of the type key.

Pumps with the special number **197** are built as pumps in combination with an electric motor or as mounted pumps. The pump in combination with an electric motor (Fig. 1) does not have an outboard bearing, so it has to be driven via an elastic coupling. The mounted pump (Fig. 2) comes equipped with an outboard bearing to absorb the centrifugal forces such as those which arise when using a flying pinion. Pumps for electric motor drives and mounted pumps are sealed at the shaft end using a lip-type shaft seal.

Fig. 1



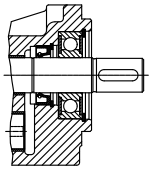
Pump with
single rotary shaft lip

Fixing type: F/W

Sealing materials:
NBR = sealing type 1
FKM = sealing type 2

Special number: 197

Fig. 2



Pump with outboard bearing
and single rotary shaft lip

Fixing type: G/X

Sealing materials:
NBR = sealing type 1
FKM = sealing type 2

Special number: 197

The noise optimized version is also available in a ductile cast iron version. We can supply these pumps in the ATEX version also.

Note

Dimensions conformable standard pumps

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

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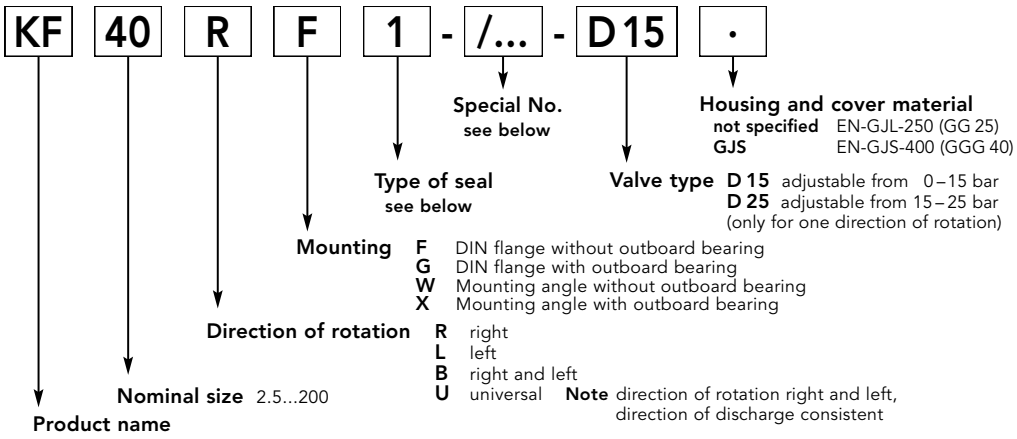
Type Key (Ordering example)



Type of seal

- **1** Rotary shaft seal BABSL NBR
- **2** Rotary shaft seal BABSL FKM
- **3** Rotary shaft seal PTFE
- **4** Double rotary shaft seal PTFE
- **5** Mechanical seal with FKM secondary seals (C2S2V1G3G1)
- **6** Mechanical seal with FFKM secondary seals Q2Q2K1G3 (KF 2.5... 25) Q2B2K1G3 (KF 32... 200)
- **7** Double rotary shaft seal BABSL FKM
- **9** Rotary shaft seal EPDM (not resistant to mineral oils)
- **19** Double rotary shaft seal BABSL NBR
- **23** Rotary shaft seal MSS-1 FKM (low temperature) (KF 2.5... 80)
- **30** Without shaft seal [1] O-ring FKM
- **31** Rotary shaft seal BABSL FKM (low temperature) (KF 32... 200)
- **32** Double rotary shaft seal EPDM (not resistant to mineral oils)
- **36** Without shaft seal [1] O-ring NBR
- **40** Mechanical seal with FKM secondary seals (AQ2VFF)

[1] Leak oil discharged through the gland pocket

Special No.

- **74** Double rotary shaft seal (for vacuum operation) Connection bore G 1/8" (for liquid seal)
- **158** KF 2.5… 12: Flange connection SAE ¾" KF 16… 25: Flange connection SAE 1"
- **197** Noise-optimized version for aerated oils and vacuum[1]
- **198** Mechanical seal KF 2.5… 25: Connection bore G 1/8" (for liquid seal) KF 32… 80: Connection bore G ¼" (for liquid seal)
- **232** KF 50...80: Flange connection SAE 2" KF 100…112: Flange connection SAE 2 ½" KF 125…150: Flange connection SAE 3" KF 180…200: Flange connection SAE 3 ½"
- **304** Polymer plain bearing iglidur® X (free from non-ferrous metals), Δp_{max} = 10 bar
- **317** Noise-optimized version for aerated oils and vacuum [1] Polymer plain bearing iglidur® X (free from non-ferrous metals), Δp_{max} = 10 bar
- **322** Triple rotary shaft seal (for normal operation + for vacuum operation) Connection bore G 1/8" (for liquid seal) Polymer plain bearing iglidur® X (free from non-ferrous metals), Δp_{max} = 10 bar KF 50… 80: Flange connection SAE 2"
- **353** Noise-optimized version for aerated oils and vacuum [1] Multi-layer plain bearing DP4 (lead-free)
- **355** Polymer plain bearing iglidur® X (free from non-ferrous metals), Δp_{max} = 10 bar Housing connection: KF 2.5… 25: as special number 158
- **363** Version for low-viscous media (housing and cover material = GJS) Polymer plain bearing iglidur® X (free from non-ferrous metals), Δp_{max} = 10 bar Housing connection: KF 2.5… 25: as special number 158 KF 50… 200: as special number 232
- **391** Noise-optimized version for aerated oils and vacuum [1] Housing connection: KF 50… 200: as special number 232
- **425** Shaft end with centre hole DIN 322-D Outboard bearing with steel cage

[1] There can be a reduction in pumping capacity. Measures for noise optimisation are only feasible for one rotational direction and only effective for aerated oils or vacuum.

Transfer Gear Pumps KF 2.5...200

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Technical Data

Nominal size	geom. displace-ment	Working pressure *	Maximum pressure (pressure peaks)	Speed range		Permissible load ** (n = 1500 1/min)	Sound level dB (A)		
	V_g cm^3/r	p_b bar	p_{max} bar	n_{min} 1/min	n_{max} 1/min	F_{radial} N	p = 5 bar	p = 15 bar	p = 25 bar
2.5	2.55	25	40	200	3600	700	≤ 65	≤ 66	≤ 67
4	4.03								
5	5.05								
6	6.38								
8	8.05								
10	10.11								
12	12.58								
16	16.09								
20	20.1								
25	25.1								
32	32.12					1500	≤ 67	≤ 68	≤ 68
40	40.21								
50	50.2								
63	63.18								
80	80.5				3000				
100	101.5						≤ 67	≤ 68	≤ 69
112	113.5								
125	129.4						≤ 65	≤ 65	≤ 65
150	155.6								
180	186.6								
200	206.2				2500				

Remark

***** Working pressure p_b = perm. sustained pressure (higher pressures on request)

****** Permissible load only for version with outboard bearing. F_{radial} at centre of shaft end.

For certain working conditions, the minimum or maximum characteristics should not be used.

For example, the max. working pressure is not permissible in combination with low speed and low viscosity.

In such limit ranges, please consult us.

Sound level measured in dB(A) at 1 m distance

Sound level measured with drive motor, installation site:
Works hall, quiet sound level = 40 dB(A)

Pump assembly on rigid fastening angle,
Suction and pressure conduits: Hose
Measured with transmission oil,
Oil viscosity ν = 34 mm^2/s,
Speed n = 1500 1/min.

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

KRACHT

Power Consumption

Speed n = 950 1/min

Discharge Q in l/min

Pressure p_b in bar								Nominal size	Pressure p_b in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
2.5	2.4	2.4	2.3	2.2	2.1	2	1.8	**2.5**	0.03	0.04	0.05	0.06	0.08	0.09	0.11	0.13
3.7	3.7	3.6	3.6	3.6	3.5	3.4	3.3	**4**	0.04	0.05	0.07	0.08	0.09	0.13	0.16	0.2
4.6	4.6	4.5	4.5	4.4	4.2	4.1	3.9	**5**	0.04	0.06	0.08	0.1	0.11	0.16	0.2	0.25
5.8	5.7	5.6	5.5	5.5	5.3	5.1	4.9	**6**	0.05	0.07	0.09	0.12	0.14	0.19	0.25	0.3
7.3	7.3	7.2	7.1	7	6.8	6.6	6.4	**8**	0.06	0.09	0.11	0.14	0.17	0.24	0.31	0.38
9.2	9.1	9	8.9	8.8	8.5	8.2	7.9	**10**	0.07	0.1	0.14	0.17	0.21	0.29	0.38	0.47
11.4	11.3	11.2	11.1	11	10.8	10.5	10.3	**12**	0.08	0.12	0.16	0.21	0.25	0.36	0.47	0.58
14.2	14	13.8	13.6	13.4	12.9	12.3	11.8	**16**	0.09	0.15	0.2	0.26	0.31	0.45	0.6	0.74
18	17.6	17.3	16.9	16.6	15.7	14.9	14	**20**	0.1	0.18	0.25	0.32	0.39	0.56	0.74	0.92
22.8	22.5	22.3	22	21.7	21.1	20.4	19.8	**25**	0.12	0.21	0.3	0.39	0.48	0.7	0.92	1.14
29	28	27	27	26	25	23	22	**32**	0.16	0.3	0.4	0.5	0.6	0.9	1.2	1.5
36	36	35	34	34	32	30	28	**40**	0.25	0.4	0.5	0.6	0.8	1.1	1.5	1.8
45	44	43	42	41	39	36	34	**50**	0.3	0.5	0.6	0.8	1	1.4	1.9	2.3
57	56	54	53	52	50	46	43	**63**	0.4	0.6	0.8	1	1.2	1.8	2.4	2.9
74	73	72	71	70	67	65	62	**80**	0.6	0.8	1.1	1.4	1.6	2.3	3	3.7
92	90	88	86	84	79	73	67	**100**	0.7	1	1.3	1.6	1.9	2.7	3.6	4.5
102	99	97	94	91	84	77	70	**112**	0.9	1.2	1.6	2	2.4	3.3	4.3	5.2
114	112	109	106	103	96	89	82	**125**	1	1.4	1.8	2.3	2.8	3.9	5	6.1
139	137	134	132	129	123	116	110	**150**	1.1	1.6	2.1	2.6	3.2	4.5	5.8	7.2
169	166	163	160	156	148	140	132	**180**	1.2	1.8	2.4	3	3.6	5.1	6.6	8.1
187	184	180	177	174	167	159	151	**200**	1.4	2.1	2.8	3.4	4	5.7	7.3	9

Power consumption P in KW

Speed n = 1450 1/min

Discharge Q in l/min

Pressure p_b in bar								Nominal size	Pressure p_b in bar							
2	4	6	8	10	15	20	25		2	4	6	8	10	15	20	25
3.6	3.6	3.5	3.5	3.5	3.4	3.3	3.2	**2.5**	0.04	0.05	0.08	0.1	0.12	0.14	0.16	0.2
5.7	5.7	5.6	5.6	5.5	5.4	5.4	5.3	**4**	0.06	0.08	0.16	0.12	0.15	0.2	0.25	0.3
6.9	6.8	6.8	6.7	6.7	6.6	6.5	6.4	**5**	0.07	0.1	0.12	0.15	0.19	0.27	0.35	0.43
8.9	8.8	8.8	8.7	8.6	8.4	8.2	8	**6**	0.08	0.11	0.115	0.18	0.22	0.32	0.39	0.47
11.3	11.2	11.1	11	10.9	10.8	10.6	10.4	**8**	0.09	0.14	0.18	0.22	0.26	0.37	0.47	0.58
14.2	14.1	14.1	13.8	13.7	13.4	13.1	12.8	**10**	0.11	0.16	0.21	0.27	0.32	0.45	0.58	0.72
17.6	17.5	17.4	17.3	17.2	16.9	16.7	16.5	**12**	0.12	0.19	0.26	0.32	0.39	0.55	0.72	0.89
22.2	21.9	21.7	21.4	21.2	20.5	19.9	19.3	**16**	0.16	0.26	0.37	0.47	0.57	0.82	1.08	1.33
27.9	27.5	27.1	26.8	26.4	25.5	24.5	23.6	**20**	0.17	0.28	0.39	0.49	0.6	0.87	1.14	1.41
35.3	35	34.7	34.4	34.1	33.3	32.6	31.8	**25**	0.24	0.34	0.47	0.61	0.74	1.08	1.41	1.75
45	44	43	43	42	41	39	37	**32**	0.3	0.5	0.7	0.8	1	1.4	1.9	2.3
57	56	55	55	54	52	50	48	**40**	0.4	0.6	0.9	1.1	1.3	1.8	2.3	2.9
70	69	68	67	66	64	61	58	**50**	0.5	0.8	1.1	1.3	1.6	2.3	2.9	3.6
88	87	86	85	84	81	78	75	**63**	0.7	1	1.3	1.7	2	2.9	3.7	4.5
114	113	112	111	110	107	105	103	**80**	0.94	1.35	1.8	2.2	2.6	3.6	4.6	5.7
144	142	140	138	137	131	128	126	**100**	1.2	1.6	2	2.5	3	4.3	5.7	7
161	159	157	154	152	147	142	138	**112**	1.4	2	2.6	3.1	3.7	5.2	6.7	8.2
181	178	175	172	169	162	155	147	**125**	1.7	2.3	2.9	3.6	4.2	5.8	7.4	9
218	216	213	211	209	203	197	191	**150**	2	2.7	3.5	4.2	5	6.9	8.9	11
264	261	257	254	251	242	234	226	**180**	2.3	3.2	4.1	5	5.9	8.2	10.4	12.7
293	290	287	283	280	272	264	256	**200**	2.6	3.6	4.6	5.6	6.6	9.1	11.6	14

Power consumption P in KW

The ratings refer to a mineral oil with a viscosity of 34 mm^2/s.

Margin of error for the flow Q + 2.5 % ... – 5 % of the tabular value. For viscosity < 30 mm^2/s, take a reduction of the rated flow Q into account.

The output of the drive motor should be selected 20 % higher than tabular value P.

For viscosity >100 mm^2/s, an increase in the required power is necessary, in this case proceed as per description on page 15.

Transfer Gear Pumps KF 2.5...200

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Discharge Flow / Input Power

Calculation

$P_{1Pu} = P_{tab} \cdot \frac{n}{1450} + f_\nu \cdot Q$

P_{1Pu} = pump power consumption (kW)

P_{tab} = power consumption per table (kW) at 1450 1/min

n = speed (1/min)
dependent on viscosity!
(see speed recommendation)

f_ν = viscosity factor $\left[\frac{kW}{l/min}\right]$
(see diagram)

Q = discharge flow (l/min) with $Q = \frac{V_g \cdot n}{1000}$

V_g = geometrical
displacement (cm^3/r)

Example: Pump type KF 80

Viscosity $\nu = 3000\ mm^2/s$
Working pressure $p = 15$ bar
at $P_{tab} = 3.6$ kW
$n = 500$ 1/min
$f_\nu = 0.017\ \frac{kW}{l/min}$

$Q = \frac{80.5 \cdot 500}{1000} = 40$ l/min

becomes

$P_{1Pu} = \left(3.6 \cdot \frac{500}{1450} + 0.017 \cdot 40\right)$ kW

$P_{1Pu} = 1.92$ kW

Motorpower output: $P_{2Mot} = 1.2 \cdot P_{1Pu} = 2.3$ kW

Select helical
geared motor with $P = 3.0$ kW
$n = 500$ 1/min

Conversion factors

1 bar ≙ 14.5 $\frac{lb}{in^2}$ = 14.5 psi

1 $\frac{l}{min}$ ≙ 0.220 $\frac{gal}{min}$ = [U.K.]

1 $\frac{l}{min}$ ≙ 0.264 $\frac{gal}{min}$ = [US]

Input Power

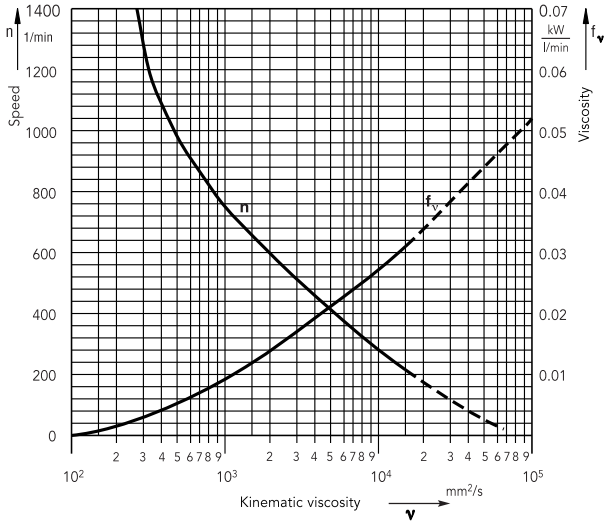


Diagramm: n, $f_\nu = f(\nu)$

Note:
To determine the power consumption, always take the max. working viscosity at starting state into consideration. The power of the drive motor should be selected 20 % higher than the value determined.

KRACHT GmbH · Gewerbestr. 20 · 58791 Werdohl, Germany · *fon* +49 (0) 23 92 / 935-0 · *fax* +49 (0) 23 92 / 935 209 · *mail* info@kracht.eu · *web* www.kracht.eu

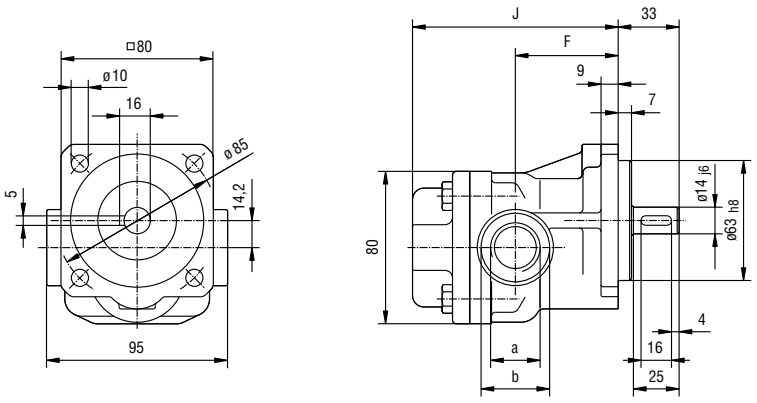
23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

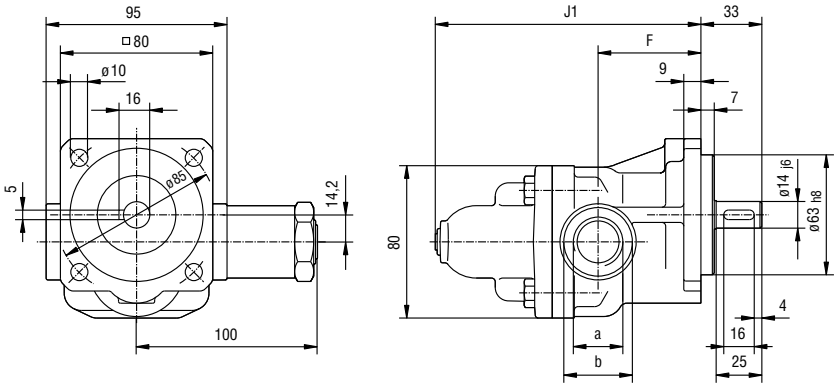
KRACHT

Flange-Mounting Version with Pipe Thread

KF 2.5... 25



KF 2.5... 25 with pressure reliev valve



Nominal size	Suction and pressure connection		F	J	J_1	Weight in kg	
	a	b				without valve	with valve
2,5...12	G ¾ 17 deep	Ø 36	54	109	140	2.9	3.7
16...25	G 1 19 deep	Ø 42	63	131	161	3.5	4.3

(Dimensions in mm)

Transfer Gear Pumps KF 2.5...200

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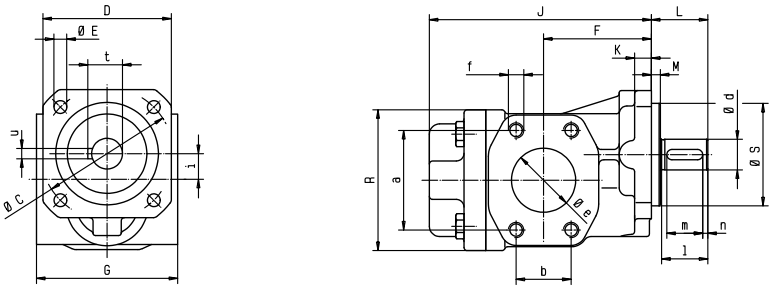
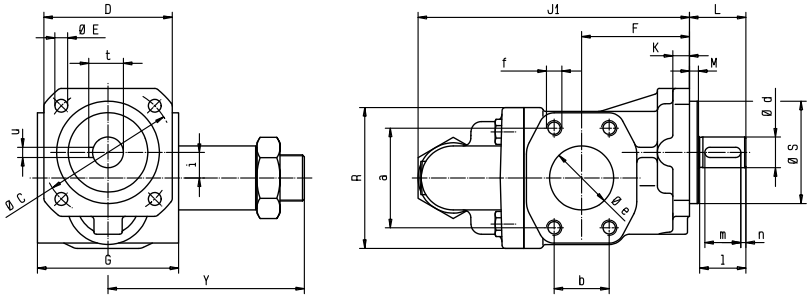
Flange-Mounting Version with SAE-Connection

KF 2.5...200



KF 2.5...200 with pressure reliev valve



Nominal size	Sp.-No.	SAE	Seal	Suction- and pressure connection a	b	e	f	Pump sizes C	D	E	F	G	J	J_1	K	L	M	R	S_{h8}	i	Y	Shaft end d_{j6}	l	m	n	t	u	Weight in kg without valve	with valve
2.5...12	158	¾"	–	47.6	22.2	19.5	M10-15deep	85	80	10	54	100	109	140	9	33	7	80	63	14,2	100	14	25	16	4	16	5	4.2	5.0
16...25	158	1"	–	52.4	26.2	25.0	M10-17deep				63		131	162														4.8	5.6
32...50	–	1½"	–	69.9	35.7	38.0	M12-20deep	103	100	10	84	110	173	212	13	44	7	110	80	20	153	24	36	28	4	27	8	7.7	9.5
63/80	–	1½"	–								100		208	247														9.4	11.2
50	232	2"	–	77.8	42.9	50.0					84		173	212														7.7	9.5
63/80	232	2"	–								100		208	247														9.4	11.2
100/112	–	2"	–			50.8		145	135	14	102	130	220.5	262.5	17	60	8	128.0	110	23.7	170.5	28	50	40	5	31		16.0	18.7
100/112	–	2"	31													46						24	36	28	4	27			
100/112	232	2½"	–	88.9	50.8	63.5										60						28	50	40	5	31			
100/112	232	2½"	31													46						24	36	28	4	27			
125/150	–	2½"	–								120	150	245.0	282.0	18	60		159				28	50	40	5	31		22.2	24.9
125/150	–	2½"	31													46						24	36	28	4	27			
125/150	232	3"	–	106.4	61.9	76.2	M16-32deep									60						28	50	40	5	31			
125/150	232	3"	31													46						24	36	28	4	27			
180/200	–	3"	–								130		262	299		60						28	50	40	5	31		24.8	27.5
180/200	–	3"	31																			24				27			
180/200	232	3½"	–	120.7	69.9	88.9																28				31			
180/200	232	3½"	31																			24				27			

(Dimensions in mm)

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

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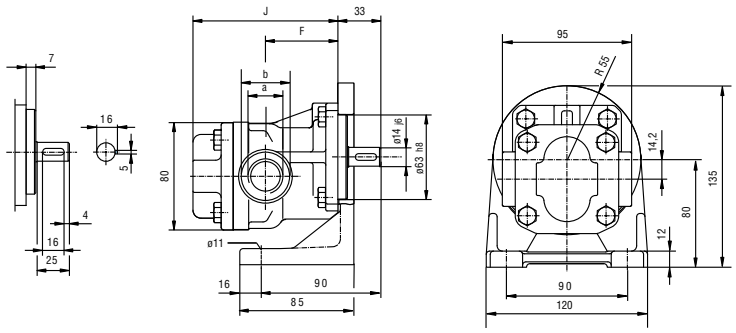
Pump with Mounting Angle, Pipe Thread

KF 2,5...25

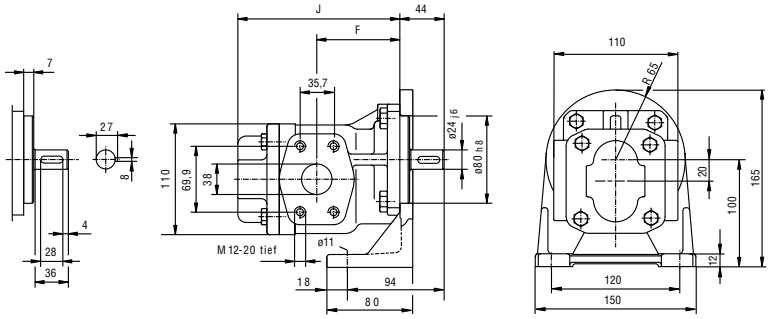


Nominal size	Suction and pressure connection a	b	F	J	Weight in kg
2,5...12	G ¾ 17 deep	Ø 36	54	109	4,2
16...25	G 1 19 deep	Ø 42	63	131	4,8

(Dimensions in mm)

Pump with Mounting Angle, Pipe Thread, SAE 1 ½-connection

KF 32...80



Nominal-size		F	J	Weight in kg
32...50	SAE 1½	84	173	9.5
63 / 80	SAE 1½	100	208	11.2

(Dimensions in mm)

Transfer Gear Pumps KF 2.5...200

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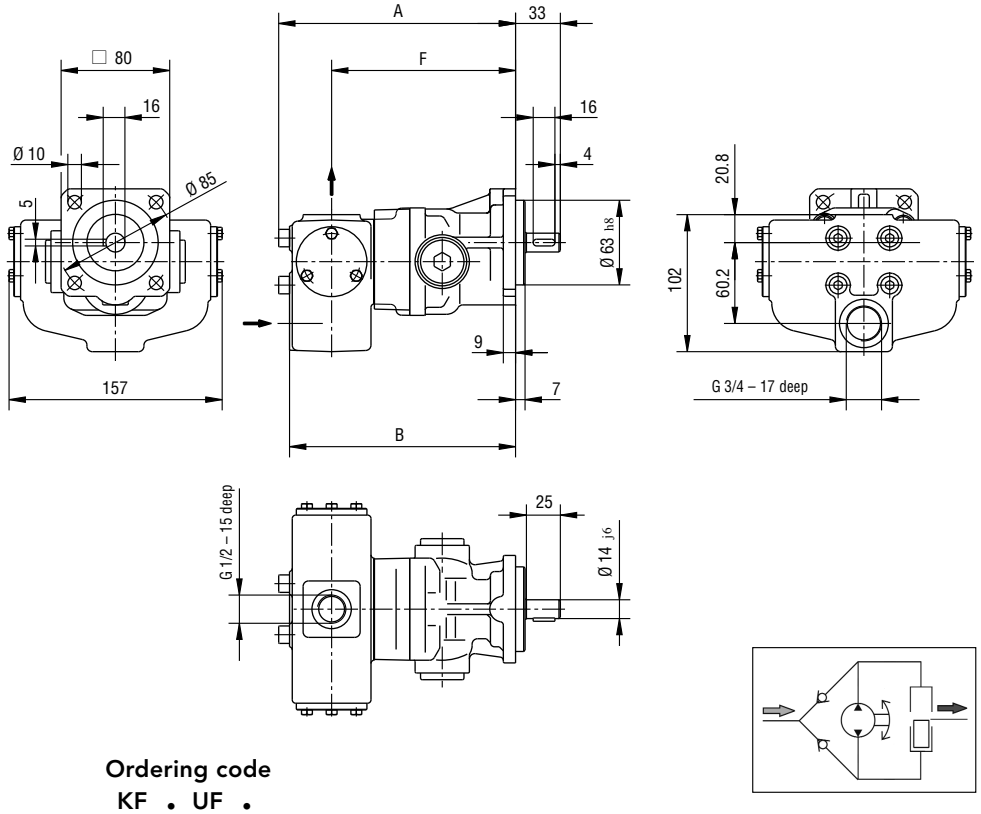
Flange-Mounting Version with Universal Arrangement

KF 2.5...25



Ordering code

KF • UF •

Seals 1 2

Nominal size	A	B	F	Weight in kg	Perm. manometr. low pressure at the pump suction connection p_e bar
2.5 4 5 6 8 10 12	174.5	166.5	135.5	6.9	0.35
16 20 25	196.5	188.5	157.5	7.5	

(Dimensions in mm)
Mounting position horizontal, Pressure connection above

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

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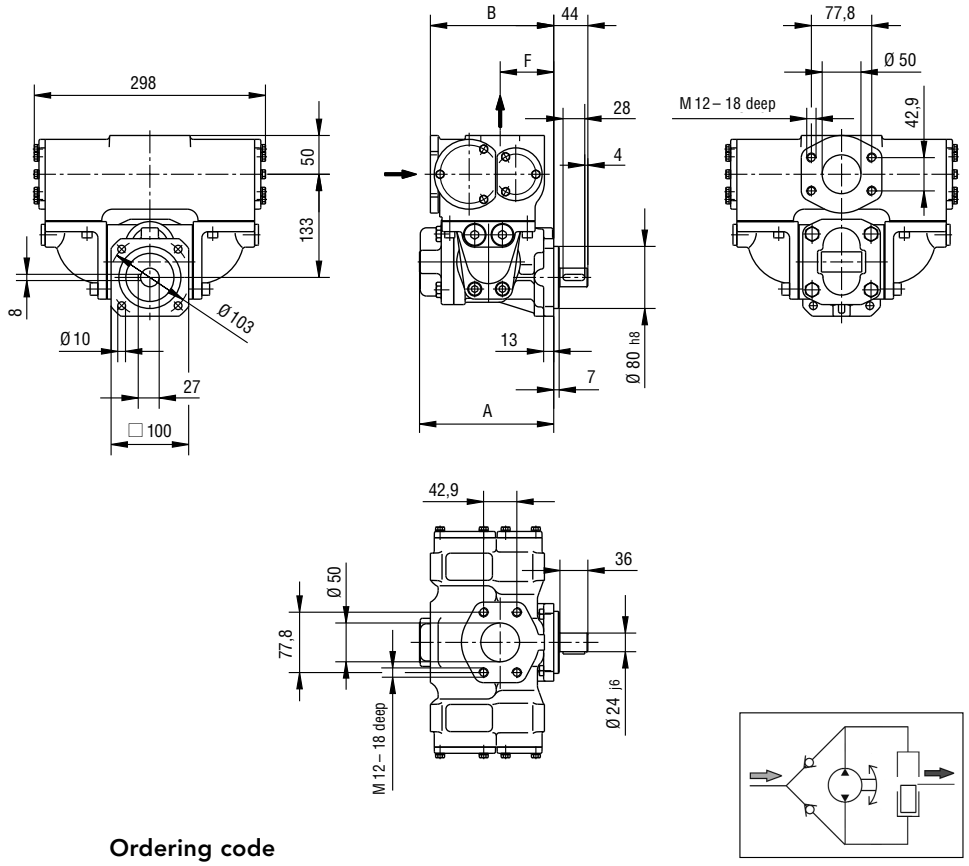
Flange-Mounting Version with Universal Arrangement

KF 32 ... 80



Ordering code

KF . UF .

Seals 1 2

Nominal size	A	B	F	Weight in kg	Perm. manometr. low pressure at the pump suction connection p_e bar
32 40 50	173	159	69	27.5	0.35
63 80	208	175	85	29.5	

(Dimensions in mm)
Mounting position horizontal, Pressure connection above

Transfer Gear Pumps KF 2.5...200

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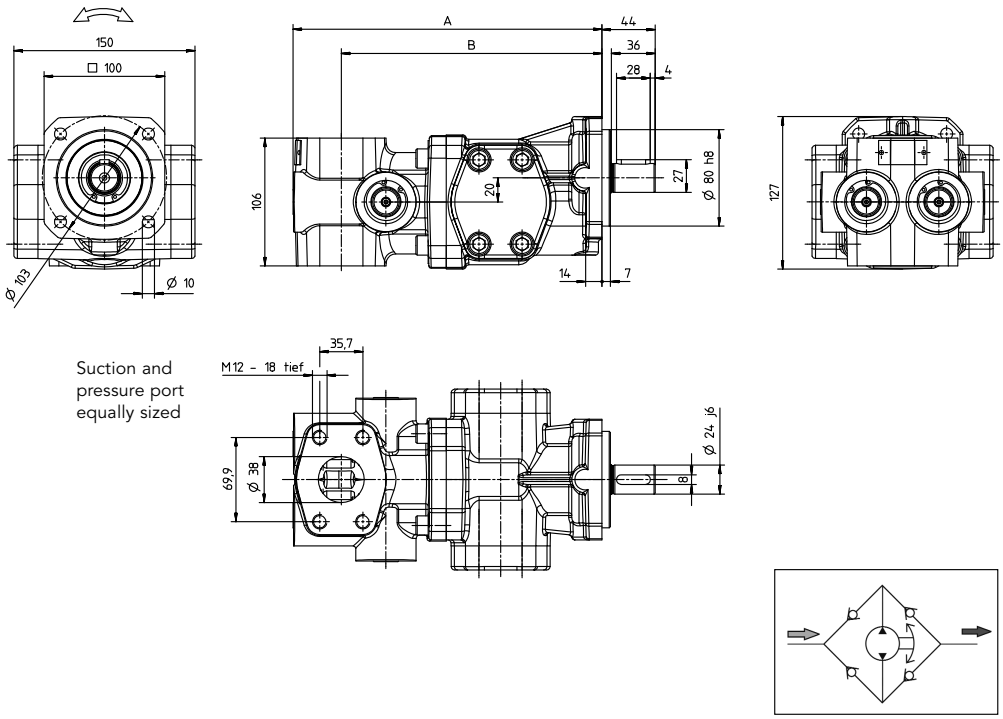
Flange-Mounting Version with Universal Arrangement U2

KF 32...80



Suction and pressure port equally sized

Nominal displacement	A	B	Weight in kg
32 **40** **50**	256	216	15.5
63 **80**	291	251	17.5

(Dimensions in mm)
Mounting position optional

Transfer Gear Pumps KF 2.5...200

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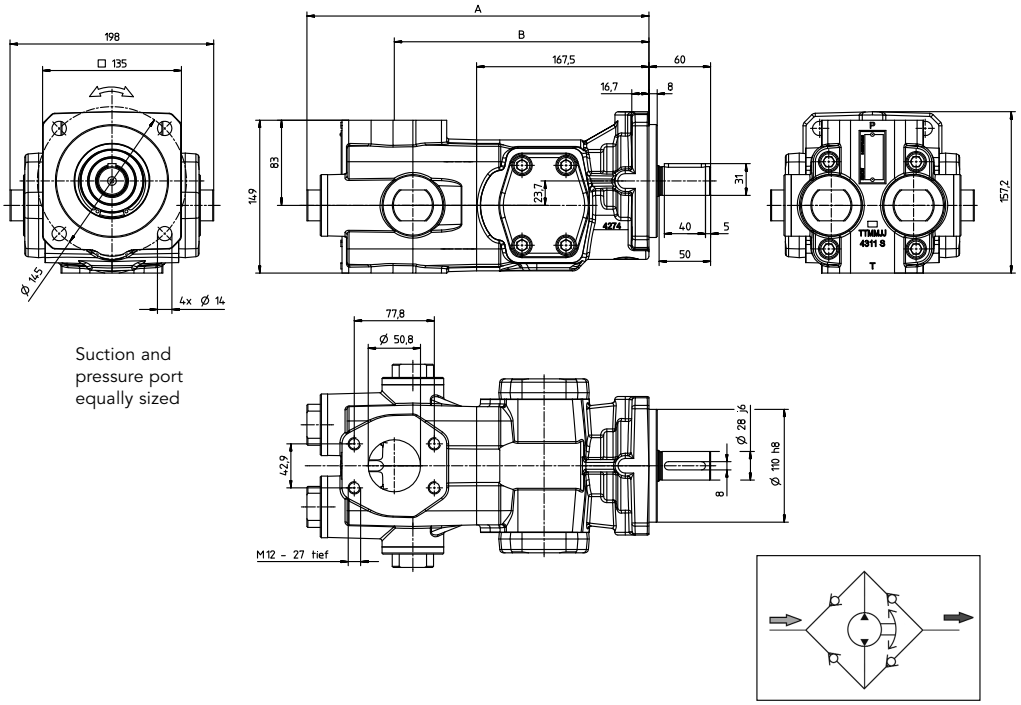
Flange-Mounting Version with Universal Arrangement U2

KF 100/112



Suction and pressure port equally sized

Nominal displacement	A	B	Weight in kg
100 112	312,5	247,5	21.6

(Dimensions in mm)
Mounting position optional

Transfer Gear Pumps KF 2.5...200

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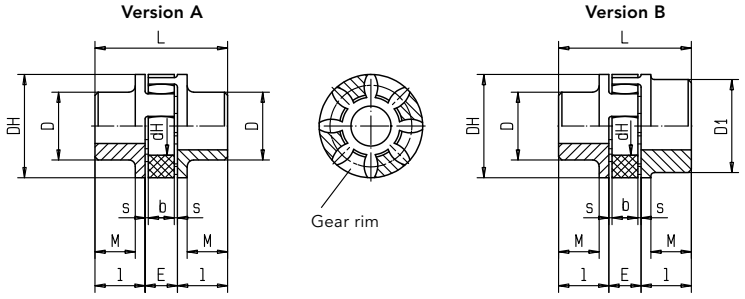
Accessory Couplings



	Ordering code	Coupling size	Weight	Moment of inertia	Pre bore		Finished bore min.		Finished bore max.		Dimensions (in mm)									
			kg	kgm²	part 1	part 2	part 1	part 2	part 1	part 2	l	E	s	b	L	M	DH	D	D_1	dh
Version A	RA 19-Z25/..-Z25/..	19	0.117	0.00003	4	–	6	–	19	–	25	16	2	12	66	20	40	32	–	18
	RA 24-Z30/..-Z30/..	24	0.24	0.00008	6	–	8	–	24	–	30	18	2	14	78	24	55	40	–	27
	RA 28-Z30/..-Z30/..	28	0.39	0.0002	8	–	10	–	28	–	30	20	2.5	15	80	28	65	48	–	30
Version B	RA 19/24-Z25/..-Z25/..	19/24	0.129	0.00004	4	17	6	19	19	24	25	16	2	12	66	20	40	32	–	18
	RA 24/28-Z30/..-Z30/..	24/28	0.26	0.0001	6	22	8	24	24	28	30	18	2	14	78	24	55	40	–	27
	RA 28/38-Z35/..-Z35/..	28/38	0.46	0.0003	8	26	10	28	28	38	35	20	2.5	15	90	28	65	48	–	30
	RA 38/45-Z45/..-Z45/..	38/45	0.89	0.0008	10	36	12	38	38	45	45	24	3	18	114	37	80	66	–	38
	RA 42/55-Z50/..-Z50/..	42/55	1.39	0.0018	12	40	14	42	42	55	50	26	3	20	126	40	95	75	–	46
	RG 42/55-Z50/..-Z75/..	42/55	3.57	0.005	12	40	14	42	42	55	50/75	26	3	20	151	40	95	75	–	46

Type Key KF Coupling

Ordering example

R.*38 - Z 45/38 - Z 45/38

- **Coupling size**
- **Pump side cylindrical**
- **Motor side cylindrical**

coupling hub lengt and hub bore

.*	Hub material
A	AL
G	GG

Working temperature:
–20 °C to +80 °C (– 4 °F to 176 °F)
(short duration temperature peaks up to 120 °C / 248 °F are permissible).

Weights and mass moments of inertia refer to max. finish machined bore without slot.
Finish-machined bores to ISO Fit H7, parallel key slots in accordance with DIN 6886 Sh.1.

23055324/FR – 05/2019

Transfer Gear Pumps KF 2.5...200

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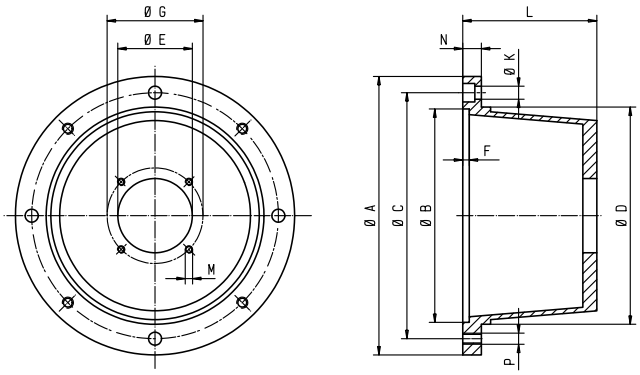
Bell Housing

KF 2,5 ... 25 Aluminum bell housing



	Motor size	Bell housing	Coupling	Dimensions (in mm)												Weight
				A	B	C	D	E	F	G	K	L	M	N	P	kg
KF 2,5...25	71 S	PT160-A-063-80	RA19-Z25/14-Z25/14	160	110	130	110	63	7	85	9	80	M8	13	M8	1.01
	71															
	80 S	PT200-A-063-100	RA19-Z25/14-Z25/19	200	130	165	145	63	7	85	11	100	M8	16	M10	1.06
	80															
	90 S	PT200-A-063-100	RA19/24-Z25/14-Z25/24	200	130	165	145	63	7	85	11	100	M8	16	M10	1.06
	90 L															
	100 LS	PT250-A-063-120	RA24/28-Z30/14-Z30/28	250	180	215	190	63	7	85	14	120	M8	19	M12	1.75
	100 L															
	112 M															
KF 32...80	80 S	PT200-A-080-100	RA19/24-Z25/24-Z25/19	200	130	165	145	80	7	103	11	100	M8	16	M10	1.41
	80															
	90 S	PT200-A-080-110	RA24-Z30/24-Z30/24	200	130	165	145	80	7	103	11	110	M8	16	M10	1.19
	90 L															
	100 LS	PT250-A-080-124	RA24/28-Z30/24-Z30/28	250	180	215	190	80	7	103	14	124	M8	19	M12	1.42
	100 L															
	112 M															
	132 S	PT300-A-080-144	RA28/38-Z35/24-Z35/38	300	230	265	234	80	7	103	14	144	M8	20	M12	2.10
	132 M															
	160 M	PT350-A-080-188	RA38/45-Z45/24-Z45/42	350	250	300	260	80	7	103	18	188	M8	26	M16	3.05
	160 L															
KF 100...200	100 L	PT250-A-110-135	RA24/28-Z30/28-Z30/28 * RS24/28-Z30/24-Z30/28	250	180	215	190	110	7	145	14	135	M12	18	M12	1.4
	112 M															
	132 S	PT300-A-110-168	RA28/38-Z35/28-Z35/38	300	230	265	234	110	7	145	14	168 *144	M12	20	M12	2.0 *1.6
	132 M	* PT300-A-110-144	* RS28/38-Z35/24-Z35/38													
	132	** PT300-A-110-168	** RS28-Z35/24-Z60/38													
	160 M	PT350-A-110-188	RA38/45-Z45/28-Z45/42 * RS38/45-Z45/24-Z45/42	350	250	300	260	110	7	145	18	188	M12	26	M16	2.9
	160 L															
	180 M	PT350-A-110-204	RA42/55-Z50/28-Z50/48 * RG42/55-Z50/24-Z75/48 ** RG42/55-Z50/24-Z50/48	350	250	300	260	110	7	145	18	204	M12	26	M16	3.0
	180 L															
	180															

***** Version seal 31 (KF 100... 150) ****** Version seal 31 (KF 180... 200)

KRACHT GmbH · Gewerbestr. 20 · 58791 Werdohl, Germany · *fon* +49 (0) 23 92 / 935-0 · *fax* +49 (0) 23 92 / 935 209 · *mail* info@kracht.eu · *web* www.kracht.eu

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SEW EURODRIVE

Transfer Gear Pumps KF 2.5...200

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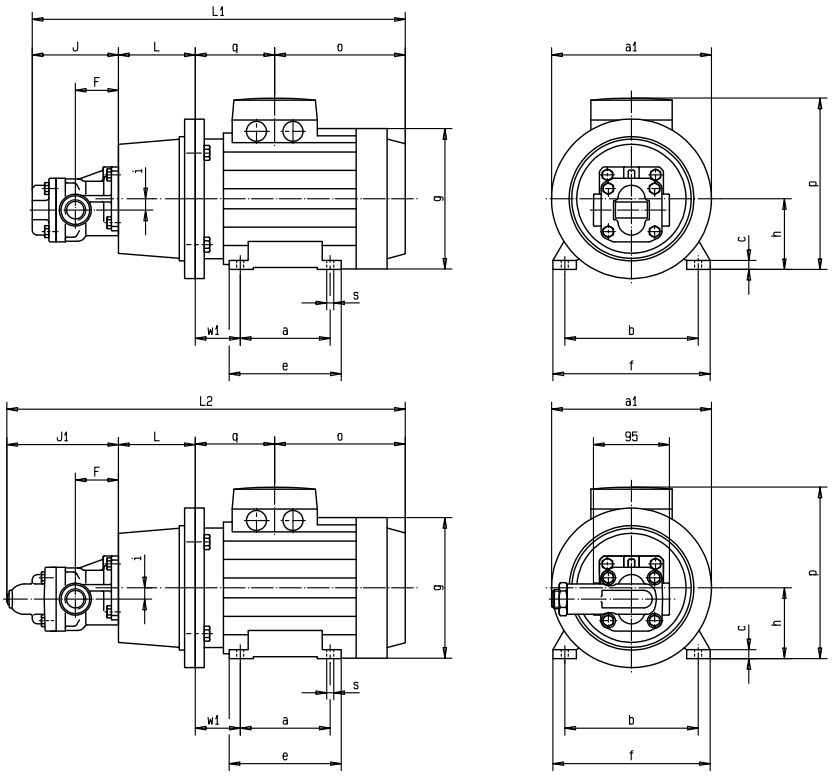
Motor-Pump Assemblies with Pipe Thread

KF 2.5 ... 25



with pressure relief valve

KF 2.5 ... 25 Pump sizes (in mm)

Nominal size	Pump sizes		
	F	J	J_1
2.5...12	54	109	140
16...25	63	131	162

Transfer Gear Pumps KF 2.5...200

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Motor-Pump Assemblies with Pipe Thread

KF 2.5 ... 25

Frame size	Power Speed Motor 6 pole		Power Speed Motor 4 pole		Bell housing	Coupling	Total weight * kg	
	kW	1/min	kW	1/min			Nominal size 4...12	16...25
71	0.18	880	0.25	1350	**PT160-A-063-80**	**RA19-Z25/14-Z25/14**	11.5	12.1
71	0.25	900	0.37	1370			11.5	12.1
80	0.37	900	0.55	1370	**PT200-A-063-100**	**RA19-Z25/14-Z25/19**	13.5	14.1
80	0.55	900	0.75	1420			15.5	16.1
90 S	0.75	935	1.1	1425	**PT200-A-063-100**	**RA19/24-Z25/14-Z25/24**	17.5	18.1
90 L	1.1	935	1.5	1420			20.5	21.1
100	1.5	940	2.2	1430	**PT250-A-063-120**	**RA24/28-Z30/14-Z30/28**	25.5	26.1
100	–	–	3	1430			28.5	29.1
112	2.2	940	4	1435			35	35.6

***** with pressure relief valve add, weight 0.8 kg

KF 2.5 ... 25 Dimensions

Frame size	Dimensions (in mm)																		
	4...12 L_1*	16...25 L_1*	4...12 L_2*	16...25 L_2*	L	i	a_1	a	b	c*	e*	f*	g*	h	o*	p*	q*	ø s*	w_1
71	414	436	445	467	80	14.2	160	90	112	10	105	132	145	71	158	188	67	7	45
80	459	481	490	512	100	14.2	200	100	125	10	130	160	165	80	170.5	217	79.5	10	50
90 S	469	491	500	522	100	14.2	200	100	140	12	130	175	185	90	177.5	235	82.5	10	56
90 L	494	516	525	547	100	14.2	200	125	140	12	155	175	185	90	202.5	235	82.5	10	56
100	555	577	586	608	120	14.2	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63
112	564	586	595	617	120	14.2	250	140	190	14	180	220	230	112	247.0	292	88	12	70

Note: Flange connection same outer dimensions as for pipe connection

Note

***** Dimensions dependent on motor typ (drawing: manufacture ADDA).
Other manufactures motors can be supplied on request.

Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

Transfer Gear Pumps KF 2.5...200

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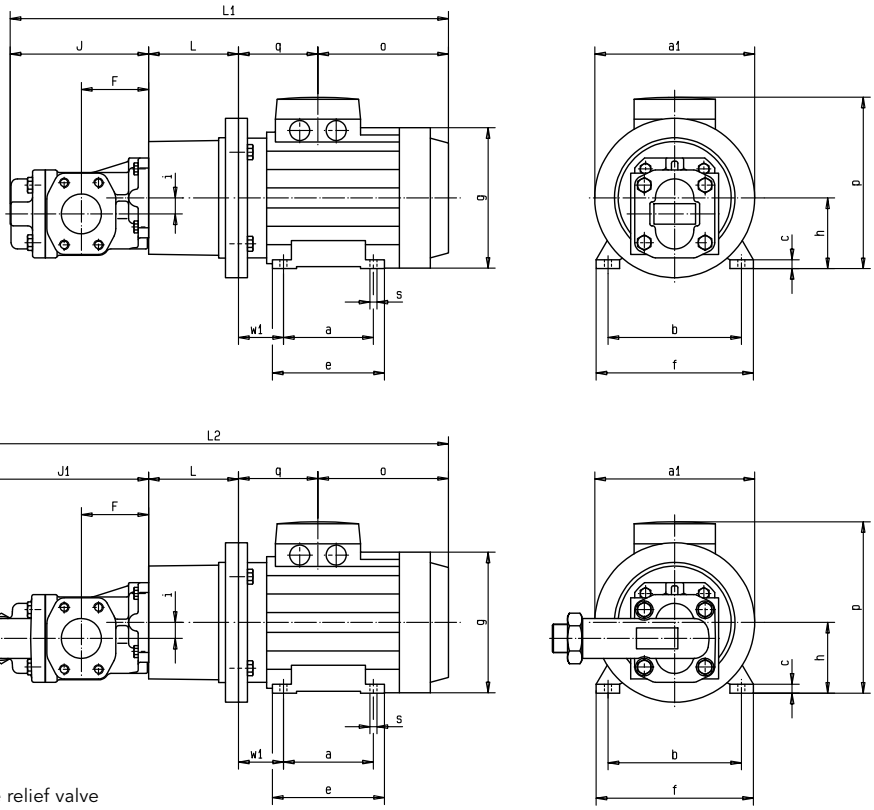
Motor-Pump Assemblies with SAE-Connection

KF 32 ... 80



with pressure relief valve

KF 32 ... 80 Pump sizes (in mm)

Nominal size	F	J	J_1
32...50	84	173	212
63 / 80	100	208	247

Motor-Pump Assemblies with SAE-Connection

KF 32 ... 80

Frame size	Power Speed Motor 6 pole		Power Speed Motor 4 pole		Bell housing	Coupling	Total weight * kg	
	kW	1/min	kW	1/min			Nominal size 32...50	63...80
80	0.37	900	0.55	1370	**PT200-A-080-100**	**RA19/24-Z25/24-Z25/19**	18.5	19.5
80	0.55	900	0.75	1420			19.5	21
90 S	0.75	935	1.1	1425	**PT200-A-080-110**	**RA24-Z30/24-Z30/24**	21	23
90 L	1.1	935	1.5	1420			23.5	25.5
100	–	–	2.2	1430	**PT250-A-080-124**	**RA24/28-Z30/24-Z30/28**	29.5	31
100	1.5	940	3	1430			32	34
112	2.2	940	4	1435			38.5	40
132 S	3	940	5.5	1430	**PT300-A-080-144**	**RA28/38-Z35/24-Z35/38**	49.5	51.5
132 M	4	945	7.5	1430			59	60.5
132 L	5.5	945	–	–			61	62.5
160 M	7.5	955	11	1440	**PT350-A-080-188**	**RA38/45-Z45/24-Z45/42**	81	82.5
160 L	11	960	15	1445			101	102.5

***** with pressure relief valve add. weight 1.8 kg

KF 32 ... 80 Dimensions

Frame size	Dimensions (in mm)																		
	32...50	63...80	32...50	63...80	32 - 80														
	L_1*	L_1*	L_2*	L_2*	L	i	a_1	a	b	c*	e*	f*	g*	h	o*	p*	q*	ø s*	w_1
80	523	558	562	597	100	20	200	100	125	10	130	160	165	80	170.5	217	79.5	10	50
90 S	543	578	582	617	110	20	200	100	140	12	130	175	185	90	177.5	235	82.5	10	56
90 L	568	603	607	642	110	20	200	125	140	12	155	175	185	90	202.5	235	82.5	10	56
100	623	658	662	697	124	20	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63
112	532	567	571	606	124	20	250	140	190	14	180	220	230	112	247	252	88	12	70
132 S	673	708	712	747	144	20	300	140	216	16	176	252	270	132	262	325	94	12	89
132 M	712	747	751	786	144	20	300	178	216	16	213	252	270	132	301	325	94	12	89
160 M	891	926	930	965	188	20	350	210	254	17	262	290	320	160	394	390	136	14.5	108
160 L	891	926	930	965	188	20	350	254	254	17	306	290	320	160	394	390	136	14.5	108

Note

***** Dimensions dependent on motor typ (drawing: manufacture ADDA).
Other manufactures motors can be supplied on request.

Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

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Transfer Gear Pumps KF 2.5...200

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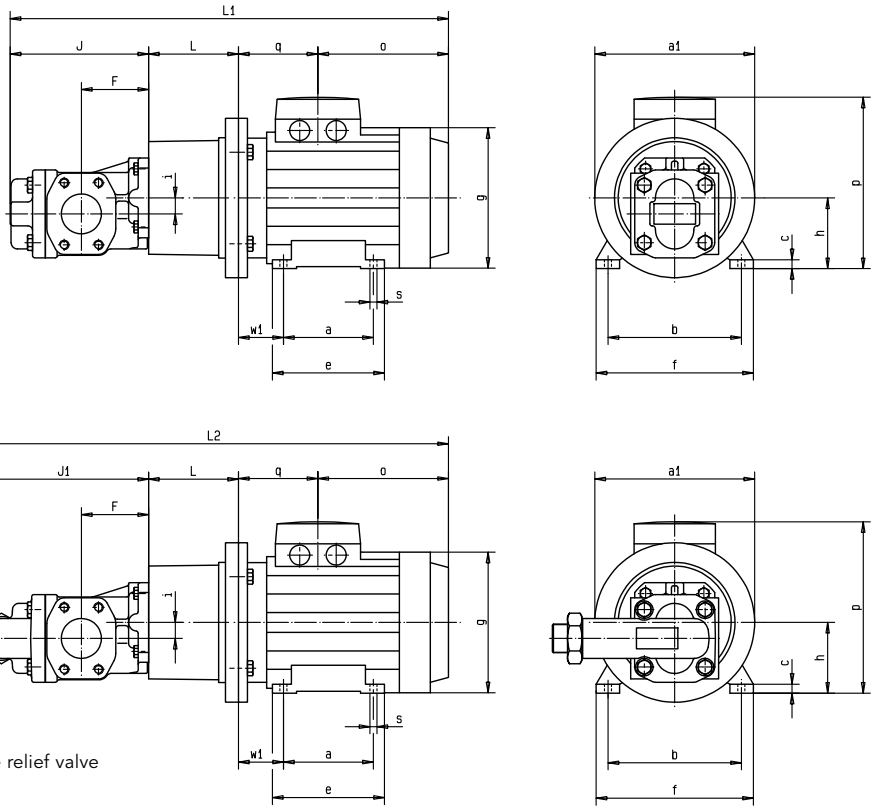
Motor-Pump Assemblies with SAE-Connection

KF 100...200



with pressure relief valve

KF 100...200 Pump sizes (in mm)

Nominal-size	F	J	J_1
100/112	102	220.5	262.5
125/150	120	245	282
180/200	130	261.5	298.5

Transfer Gear Pumps KF 2.5...200

KRACHT

Motor-Pump Assemblies with SAE-Connection

KF 100...200

Frame size	Power Speed Motor 6 pole		Power Speed Motor 4 pole		Bell housing	Coupling	Total weight * kg		
	kW	1/min	kW	1/min			Nominal size 100/112	125/150	180/200
100 L	–	–	2.2	1430	**PT250-A-110-135**	**RA24/28-Z30/28-Z30/28**	37.5	43.5	46.5
100 L	1.5	940	3	1430		****RA24/28-Z30/24-Z30/28**	40.5	46.5	49.5
112 M	2.2	940	4	1435			47.5	53.5	56.5
132 S	3	940	5.5	1430	**PT300-A-110-168**	**RA28/38-Z35/28-Z35/38**	58	64	67
132 M	4	945	7.5	1430	****PT300-A-110-144**	****RA28/38-Z35/24-Z35/38**	67	73	76
132 L	5.5	945	–	–			69	75	78
160 M	7.5	955	11	1430	**PT350-A-110-188**	**RA38/45-Z45/28-Z45/42**	89	95	98
160 L	11	960	15	1140		****RA38/45-Z45/24-Z45/42**	109	115	118
180 M	–	–	18.5	1445	**PT350-A-110-204**	**RA42/55-Z50/28-Z50/48**	129	135	138
180 L	15	960	22	1460		****RG42/55-Z50/24-Z50/48**	139	145	148

***** with pressure relief valve KF 100-200 add. weight 2.7 kg
** Sealing version 31

KF 100 ... 200 Dimensions

Frame size	Dimensions (in mm)																		
	100/112 L_1*	125/150 L_1*	180/200 L_1*	100/112 L_2*	125/150 L_2*	180/200 L_2*	L	a_1	a	b	c*	e*	f*	g*	h	o*	p*	q*	øs*	w_1
100	670.5	695	711.5	712.5	754	770.5	124	250	140	160	14	176	196	205	100	247.5	252	78.5	12	63
112	579.5	604	620.5	621.5	663	679.5	124	250	140	190	14	180	220	230	112	147	292	88	12	70
132 S	720.5	745	761.5	762.5	804	820.5	144	300	140	216	16	176	252	270	132	262	325	94	12	89
132 M	759.5	784	800.5	801.5	843	859.5	144	300	178	216	16	213	252	270	132	301	325	94	12	89
160 M	938.5	963	979.5	980.5	10221038.5		188	350	210	254	17	262	290	320	160	394	390	136	14.5	108
160 L	938.5	963	979.5	980.5	10221038.5		188	350	254	254	17	306	290	320	160	394	390	136	14.5	108
180 M	1001.5	1026	1042.5	1043.5	10851101.5		204	350	279	279	27	300	348	360	180	336	450	241	15	121
180 L	1039.5	1064	1080.5	1081.5	11231139.5		204	350	279	279	27	338	348	360	180	354	450	261	15	121

Note

***** Dimensions dependent on motor typ (drawing: manufacture ADDA).
Other manufactures motors can be supplied on request.

Motor frame sizes are based on DIN 42673/677.

All pump and motor sizes can be combined.

Transfer Gear Pumps KF 2.5...200

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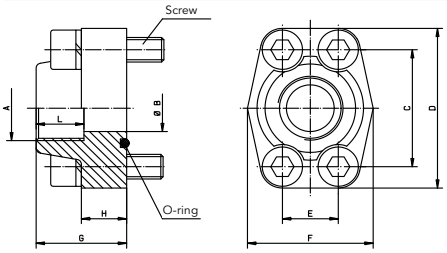
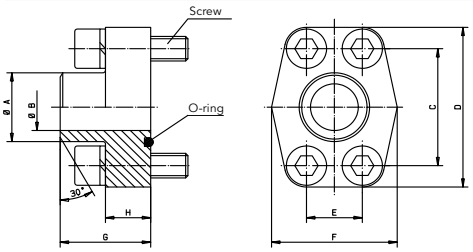
Accessory Connections

SAE-Threaded Flange



SAE-Welding Flange



SAE-Threaded Flange Dimensions (in mm)

Nominal size SAE	DN	A	B max.	C	D*	E	F*	G	H*	L min.	Screws 10.9	O-ring	Working pressure max.**	Weight ca. [kg]
3/4"	13	G1/2"	13	47.63	65	22.23	50	36	18	14	M 10x35	24.99 x 3.53	350	0.54
	19	G3/4"	19							16				0.51
1"	13	G1/2"	13	52.37	70	26.19	55	38	18	14	M 10x35	32.92 x 3.53	315	0.64
	19	G3/4"	19							16				0.61
	25	G1"	25							18				0.58
1 1/4"	19	G3/4"	19	58.72	79	30.18	68	41	21	16	M 10x40	37.69 x 3.53	250	0.92
	25	G1"	25					42	25	18				0.88
	32	G1 1/4"	32					41	21	20				0.79
1 1/2"	25	G 1 "	25	69.85	93	35.71	78	45	25	18	M 12x45	47.22 x 3.53	200	1.36
	32	G 1 1/4"	32						27	20				1.30
	38	G 1 1/2"	38						25	22				1.25
2"	25	G1"	25	77.77	102	42.88	90	45	25	18	M 12x45	56.74 x 3.53	200	1.64
	32	G11/4"	32							20				1.60
	38	G1 1/2"	38							22				1.45
	51	G2"	51							26				1.39
2 1/2"	51	G2"	51	88.90	114	50.80	105	50	25	26	M 12x45	69.44 x 3.53	160	1.65
	64	G2 1/2"	63							30				1.60
3"	64	G2 1/2"	63	106.38	134	61.93	124	50	27	30	M 16x50	85.32 x 3.53	138	2.68
	76	G3"	73											2.58
3 1/2"	76	G3"	73	120.65	152	69.85	136	48	27	30	M 16x50	98.02 x 3.53	35	2.93
	89	G3 1/2"	89											2.83

SAE-Welding Flange Dimensions (in mm)

Nominal size SAE	DN	A*	B max.	C	D*	E	F*	G	H*	Screws 10.9	O-ring	Working pressure max.**	Weight ca. [kg]
3/4"	19	28.0	19	47.63	65	22.23	50	36	18	M 10x35	24.99 x 3.53	350	0.51
1"	25	34.0	25	52.37	70	26.19	55	38	18	M 10x35	32.92 x 3.53	315	0.58
1 1/4"	32	42.8	32	58.72	79	30.18	68	41	21	M 10x40	37.69 x 3.53	250	0.79
1 1/2"	38	48.6	38	69.85	93	35.71	78	44	25	M 12x45	47.22 x 3.53	200	1.25
2"	51	61.0	51	77.77	102	42.88	90	45	25	M 12x45	56.74 x 3.53	200	1.39
2 1/2"	64	77.0	63	88.90	114	50.80	105	50	25	M 12x45	69.44 x 3.53	160	1.60
3"	76	92.0	73	106.38	134	61.93	124	50	27	M 16x50	85.32 x 3.53	138	2.58
3 1/2"	89	103.0	89	120.65	152	69.85	136	48	27	M 16x50	98.02 x 3.53	35	2.83

* Dimensions depending on the manufacturer ** O-ring material with hardness 90 Shore A
Material: Steel S355J2G3 or equivalent Stainless steel 1.4404 or equivalent 316L

KRACHT GmbH · Gewerbestr. 20 · 58791 Werdohl, Germany · *fon* +49(0)23 92/935-0 · *fax* +49(0)23 92/935 209 · *mail* info@kracht.eu · *web* www.kracht.eu

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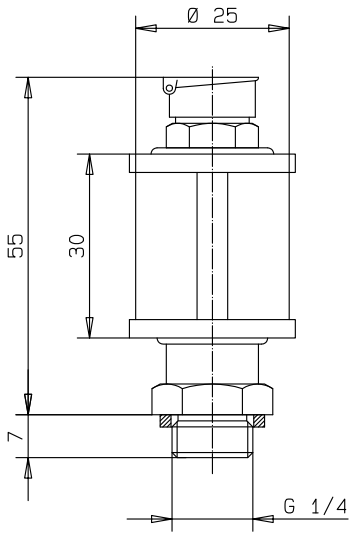
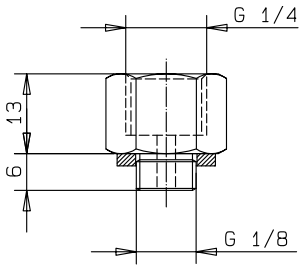
Accessory Quench Chamber

Quench tank



Adapter for screw size tap G ⅛



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Product Portfolio

Transfer Pumps

Transfer pumps for lubricating oil supply equipment, low pressure filling and feed systems, dosing and mixing systems.

Mobile Hydraulics

Single and multistage high pressure gear pumps, hydraulic motors and valves for construction machinery, vehicle-mounted machines.

Flow Measurement

Gear and turbine flow meters and electronics for volume and flow metering technology in hydraulics, processing and laquering technology.

Industrial Hydraulics / Test Bench Construction

Cetop directional control and proportional valves, hydraulic cylinders, pressure, quantity and stop valves for pipe and slab construction, hydraulic accessories for industrial hydraulics (mobile and stationary use).

Technology Test benches / Fluid Test benches.

KF2.5...200/GB/06.14

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KRACHT GmbH · Gewerbestraße 20 · 58791 Werdohl, Germany · *fon* +49 (0) 23 92 / 935-0 · *fax* +49 (0) 23 92 / 935 209
mail info@kracht.eu · *web* www.kracht.eu

23055324/FR – 05/2019

Bedienungsanleitung

Für künftige Verwendung bitte aufbewahren

Membran-/ Kolbendruckschalter mit Gerätesteckdose Baureihe 0184 Baureihe 0185

D

Einbau und Inbetriebnahme sind nach dieser Bedienungsanleitung und nur von autorisiertem Fachpersonal vorzunehmen.

SUCO Robert Scheuffele GmbH & Co. KG
Keplerstraße 12-14
74321 Bietigheim-Bissingen, Germany
Telefon: 07142/597-0
Telefax: 07142/980151
E-Mail: info@suco.de
www.suco.de

Funktion und Anwendung

Die Baureihe 0184/0185 öffnet oder schließt einen elektrischen Stromkreis beim Erreichen eines einstellbaren Druckwerts. Durch das Ansteigen des Drucks wird eine Membrane bzw. ein Kolben bewegt. Die Auslenkung der Membrane bzw. der Hub des Kolbens hängt von der Druckkraft und der einstellbaren Federvorspannung ab. Bei einer definierten Auslenkung der Membrane bzw. einem definierten Hub des Kolbens wird ein Mikroschalter betätigt, der die elektrischen Kontakte öffnet bzw. schließt (Wechsler).

☞ Der Druckschalter überwacht einen eingestellten Druckwert.

Voraussetzungen für den Produkteinsatz

Allgemeine, stets zu beachtende Hinweise für den ordnungsgemäßen und sicheren Einsatz des Druckschalters:

☞
- Beachten Sie unbedingt die Warnungen und Hinweise in der Bedienungsanleitung.
- Beachten Sie die Vorschriften der Berufsgenossenschaften, des Technischen Überwachungsvereins (TÜV) oder die entsprechenden nationalen Bestimmungen.
- Der Druckschalter ist für die Überwachung von flüssigen und gasförmigen Medien bestimmt.

☞
- Halten Sie die angegebenen Grenzwerte wie z.B. Drücke, Kräfte, Momente und Temperaturen ein.
- Berücksichtigen Sie die vorherrschenden Umgebungsbedingungen (Temperatur, Luftfeuchte, Luftdruck etc.).
- Setzen Sie den Druckschalter niemals starken Stößen oder Vibrationen aus.
- Verwenden Sie das Produkt nur im Originalzustand. Nehmen Sie keine eigenmächtige Veränderung vor.
- Entfernen Sie alle Transportvorkehrungen wie Schutzfolien, Kappen oder Kartonagen.

♻
- Die Entsorgung der einzelnen Werkstoffe in Recycling-Sammelbehältern ist möglich.

Betriebsbedingungen

⚠ Bei Medientemperaturen außerhalb der Raumtemperatur (20 °C):
- Extreme Temperatureinflüsse (abweichend von der Raumtemperatur) können zu einer starken Schaltpunktabweichung oder zum Ausfall des Druckschalters führen.

Schutzart IP65:
Die Typenprüfung ist nicht uneingeschränkt auf alle Umweltbedingungen übertragbar.
Die Überprüfung, ob die Steckverbindung anderen als den angegebenen Bestimmungen und Vorschriften entspricht bzw. ob diese in speziellen, von uns nicht vorgesehenen Anwendungen eingesetzt werden kann, obliegt dem Anwender.

Sauerstoffeinsatz:

Membrandruckschalter:
Beim Einsatz von Sauerstoff sind die einschlägigen Unfallverhütungsvorschriften zu beachten. Außerdem empfehlen wir, einen maximalen Betriebsdruck von 10 bar nicht zu überschreiten.

Kolbendruckschalter:
Kolbendruckschalter sind für gasförmige Medien, insbesondere für Sauerstoff, **nicht** geeignet.

Überdrucksicherheit:
In den Technischen Daten ist die statische Überdrucksicherheit angegeben. Sie bezieht sich auf den hydraulischen bzw. pneumatischen Teil des Druckschalters. Der dynamische Wert ist 30 bis 50% niedriger.

Technische Daten

Bemessungsbetriebs-spannung U_e	Bemessungs-betriebsstrom I_e	Gebrauchs-kategorie
250 Volt AC 50/60 Hz	4 Ampere	AC 12
250 Volt AC 50/60 Hz	1 Ampere	AC 14
30 Volt DC	4 / 4 Ampere	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere	DC 12 / DC 13
75 Volt DC	1 / 0,5 Ampere	DC 12 / DC 13
125 Volt DC	0,3 / 0,2 Ampere	DC 12 / DC 13
250 Volt DC	0,25 / 0,2 Ampere	DC 12 / DC 13

Bemessungsisolationsspannung U_i:	300 Volt
Bemessungsstoßspannungsfestigkeit U_{imp}:	2,5 kV
Konventioneller thermischer Strom I_{the}:	5 Ampere
Schaltübespannung:	< 2,5 kV
Bemessungsfrequenz:	DC und 50/60 Hz
Nennstrom der Kurzschlusseinrichtung:	bis 5 Ampere
Bedingter Kurzschlussstrom:	< 350 Ampere
IP-Schutzart nach EN 60 529:1991:	IP65 mit Stecker
Anzugsdrehmoment der Anschlussschrauben:	< 0.35 Nm
Anschlussquerschnitt:	0,5 bis 1,5 mm²

Art.-Nr.: 1-1-84-628-006.A 08/08

Bitte wenden

Technische Änderungen zur Produktverbesserung vorbehalten.

Zeichenerklärung:
⚠ Achtung ☞ Hinweis, Bemerkung ♻ Recycling ⚠ Gefahr

Operating Instructions

Please keep carefully for future use

Diaphragm-/ Piston Pressure Switch with connector Series 0184 Series 0185

GB

Installation and commissioning must be carried out in accordance with these Operating Instructions and by authorized, qualified personnel only.

SUCO Robert Scheuffele GmbH & Co. KG
Keplerstraße 12-14
74321 Bietigheim-Bissingen, Germany
Phone: + 49-7142-597-0
Fax: + 49-7142-980151
e-Mail: info@suco.de
www.suco.de

Operation and use

The series 0184/0185 switch opens or closes an electrical circuit when a certain (adjustable) pressure is reached. A diaphragm or piston is moved by the increase in pressure. The amount of diaphragm deflection or piston travel depends on the force of the pressure applied and the (adjustable) spring tension. At a predetermined deflection of the diaphragm or movement of the piston, a microswitch is actuated which opens or closes the electrical contacts (changeover).

☞ The pressure switch monitors a preset pressure.

Conditions governing the use of the product

The following general instructions are to be observed at all times to ensure the correct, safe use of the pressure switch:

☞
- Observe without fail the warning notices and other instructions laid down in the operating instructions.
- Observe the applicable safety regulations laid down by the regulatory bodies in the country of use.
- Use the switch only for monitoring fluid and gaseous medias.

☞
- Do not exceed the specified limits for e.g. pressures, forces, moments or temperatures under any circumstances.
- Give due consideration to the prevailing ambient conditions (temperature, atmospheric humidity, atmospheric pressure, etc.).
- Never expose the pressure switch to severe side impacts or vibrations.
- Use the product only in its original condition. Do not carry out any unauthorized modifications.
- Remove all items providing protection in transit such as foils, caps or cartons.

♻
- Disposal of the above-named materials in recycling containers is permitted.

Operating conditions

⚠ Media temperatures other than room temperature (20 °C):
- The effects of extreme temperatures (relative to room temperature) can lead to pronounced variations in the switching point or the failure of the pressure switch.

Type of protection IP65:
Type testing does not apply to all ambient conditions without limitations. The user is responsible for verifying that the plug-and-socket connection complies with the specified rules and regulations of CE, or whether it may be used for specialized purposes other than those intended by us.

Use with oxygen:

Diaphragm Pressure Switch:
If oxygen is used, the applicable accident prevention regulations must be observed. In addition, we recommend a maximum operating pressure of 10 bar, which should not be exceeded.

Piston Pressure Switch:
Piston Pressure Switches are **not** suitable for gaseous media, particulary oxygen.

Protection against overpressure:
The static overpressure safety is included in the technical data.
The overpressure safety corresponds to the hydraulic, pneumatic part of the pressure switch. The dynamic rating of the overpressure safety is smaller than 30 to 50%.

Technical data

Rated operating voltage U_e	Rated operating current I_e	Utilization category
250 Volt AC 50/60 Hz	4 Ampere	AC 12
250 Volt AC 50/60 Hz	1 Ampere	AC 14
30 Volt DC	4 / 4 Ampere	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere	DC 12 / DC 13
75 Volt DC	1 / 0.5 Ampere	DC 12 / DC 13
125 Volt DC	0.3 / 0.2 Ampere	DC 12 / DC 13
250 Volt DC	0.25 / 0.2 Ampere	DC 12 / DC 13

Rated insulation voltage U_i	300 Volt
Rated surge capacity U_{imp}:	2.5 kV
Rated thermal current I_{the}:	5 Ampere
Switching overvoltage:	< 2.5 kV
Rated frequency:	DC und 50/60 Hz
Rated current of short-circuit protective decvice:	Up to 5 Ampere
Rated short-circuit current:	< 350 Ampere
IP-protection to EN 60 529:1991:	IP65 with plug
Tightening torque for terminal screws:	< 0.35 Nm
Connection size:	0.5 to 1.5 mm²

Art.-No.: 1-1-84-628-006.A 08/08

PTO

Continuing development sometimes necessitates specification changes without notice.

Key to drawings:
⚠ Caution ☞ Note ♻ Recycling ⚠ Danger

Mode d'emploi

A conserver pour toute utilisation ultérieure

Pressostat à membrane/ ou à piston avec connecteur Série 0184 Série 0185

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Montage et mise en service sont à entreprendre d'après le présent mode d'emploi et par le personnel autorisé seulement.

SUCO Robert Scheuffele GmbH & Co. KG
Keplerstraße 12-14
74321 Bietigheim-Bissingen, Germany
Téléphone: + 49-7142-597-0
Fax: + 49-7142-980151
e-Mail: info@suco.de
www.suco.de

Fonctionnement et applications

Les séries 0184/0185 ouvrent ou ferment un circuit électrique dès qu'une valeur de pression pré-réglée est atteinte. La montée en pression agit sur une membrane ou un piston. L'ampleur de la déformation subie par la membrane ou la course du piston dépend de la pression exercée et de la précontrainte pré-réglée sur un ressort. Par une déformation de la membrane ou une course du piston donnée, le microrupteur est actionné; il ouvre ou il ferme le circuit électrique (inverseur).

☞ Le pressostat contrôle une valeur de pression pré-réglée!

Consignes relatives à la mise en service

Remarques d'ordre général, mais dont il faut toutefois toujours tenir compte, pour obtenir un fonctionnement fiable et sûr du pressostat:

☞
- Impérativement respecter les avis et les remarques données dans le mode d'emploi.
- Toujours respecter les prescriptions et directives des Chambres syndicales, des Services de contrôle technique ainsi que les dispositions légales nationales.
- Utiliser le pressostat exclusivement avec des fluides liquides ou gazeux.

☞
- Respecter les valeurs seuils indiquées (pressions, forces, moments, températures, par exemple).
- Tenir compte des conditions environnantes rencontrées (température ambiante, humidité atmosphérique, pression atmosphérique, etc.).
- Veillez à ce que le pressostat ne soit jamais soumis à des fortes accélérations, vibrations, et des chocs forts.
- N'utiliser le produit que dans son état original. Ne jamais entreprendre des modifications quelconques sur celui-ci.
- Retirer tous les éléments de protection nécessaire pour le transport, telles que emballages, capuchons ou cartons.

♻
- Tous les matériaux susmentionnés sont recyclables et peuvent être déposés dans des conteneurs prévus à cet effet!

Conditions d'utilisation

⚠ En présence de températures des fluides autres que la température ambiante (20 °C):
- Des températures ambiantes extrêmes peuvent provoquer une forte dérive du point de commutation ou une défaillance du pressostat.

Indice de protection IP65:
Cet indice est fortement dépandant de l'environnement dans lequel travaille le pressostat.
L'utilisateur est tenu de vérifier si le connecteur répond aux prescriptions et réglements autres que ceux indiqués dans la notice, ou s'il peut être utilisé pour des applications non prévues par nous.

Utilisation avec l'oxygène:

Pressostat à membrane:
Pour la manipulation d'oxygène, la réglementation afférente à la Sécurité de Travail et à la Prévention d'Accidents devra impérativement être respectée. Nous conseillons en outre de ne pas dépasser une pression de service de 10 bar maximum.

Pressostat à piston:
Les pressostats à piston **ne sont pas** appropriés à la manipulation de fluides gazeux, l'oxygène en particulier.

Soupape de surpression:
La valeur admise de surpression statique est exprimée dans les caractéristiques techniques. Elle se réfère à la valeur hydraulique ou pneumatique du pressostat. La valeur dynamique est de 30% jusqu' à 50% inférieure.

Caractéristiques techniqus

Tension de assignées d'emploi U_e	Intensité de service de référence I_e	Catégorie de service
250 V CA 50/60 Hz	4 Ampère	CA 12
250 V CA 50/60 Hz	1 Ampère	CA 14
30 V CC	4 / 4 Ampère	CC 12 / CC 13
50 V CC	2 / 1 Ampère	CC 12 / CC 13
75 V CC	1 / 0,5 Ampère	CC 12 / CC 13
125 V CC	0,3 / 0,2 Ampère	CC 12 / CC 13
250 V DC	0,25 / 0,2 Ampère	CC 12 / CC 13

Tension d'isolement de référence U_i:	300 V
Résistance de référence aux ondes de surtension U_{imp}:	2,5 kV
Courant thermique nominal I_{the}:	5 Ampère
Surtension de commutation:	< 2,5 kV
Fréquence de référence:	CC et 50/60 Hz
Courant nominal de protection contre les court-circuits:	jusqu' à 5 Ampère
Courant de court-circuit conditionnel:	< 350 Ampère
Protection IP selon EN 60 529:1991:	IP65 avec connecteur
Couple de serrage des vis de raccordement:	< 0,35 Nm
Section de raccordement:	0,5 à 1,5 mm²

Référence: 1-1-84-628-006.A 08/08

T.S.V.P.

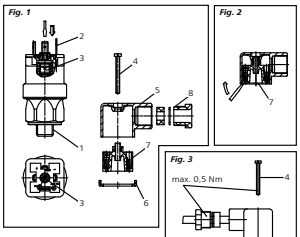
Soucieux d'apporter une amélioration constante à nos produits, les caractéristiques peuvent évoluer sans préavis.

Explication des symboles:
⚠ Attention ☞ Nota, remarque ♻ Recyclage ⚠ Danger

23055324/FR – 05/2019

Presse-étoupe:	Pg 9
Connecteur DIN 43650 lumineux à LED:	Pg 11
Diamètre du câble:	Pg 9: 6 à 9 mm Pg 11: 6 à 11 mm
Fréquence de commutation:	< 200 min^{-1}
Hystérésis:	10 à 30% réglable en usine
Durée de vie mécanique Version à membrane (0184):	10^8 cycles de manoevre (pour des pressions de commutation jusqu' à 50 bar)
Version à piston (0184):	10^6 cycles de manoevre
Corps:	acier zingué, nickelé (Fe//ZnNi(12)6//A/T2)
Tenue à la temperature:	NBR -40 °C à +100 °C EPDM -30 °C à +120 °C FKM -5 °C à +120 °C
Securité de surpression Pressostat à membrane (0184):	100 bar (0,3 à 1,5 bar) 300 bar (autres plages)
Pressostat à piston (0185):	600 bar

Eléments de manœuvre et de raccordement



(1) Raccordement hydraulique/ pneumatique
(2) Raccordement électrique
(3) Vis de réglage du point de commutation
(4) Vis de fixation
(5) Boîtier du connecteur
(6) Joint profilé
(7) Embase de montage
(8) Raccord Pg, avec joint et bague d'appui

Montage

Mécanique, pneumatique, hydraulique:
A l'aide d'une clé plate de 27 (DIN 894 ou analogue), visser par l'embout 6 pans le pressostat dans le raccord de pression prévu (couple dynamométrique: voir le tableau suivant).

L'étanchéité du système est assurée par une bague en cuivre, aux dimensions correspondantes.

Attention: ne jamais serrer le pressostat en le saisissant par ses parties en plastique! Risque de détérioration!

Filetage du raccord	Couple dynamométrique
M10 x 1 conique et NPT 1/8	Visser jusqu' à ce que le système soit hermétique
M10 x 1 cylindrique	35 Nm
Autres	45 Nm

Electrique:
N'utiliser que le connecteur fourni par nos services.
S'assurer que le câble électrique soit exempt
- d'écrasements,
- de coudes trop prononcés
- qu' il soit installé de manière à ne pas pouvoir s'allonger.

Câblage avec le connecteur:

1. Oter la vis de fixation (4) présente à l'extrémité (la conserver en lieu sûr).
2. Démonter l'embase de montage (7) ainsi libérée (Fig. 2).
3. Raccorder les conducteurs (section maxi: 1,5 mm²) sur les bornes prévues à cet effet (Fig. 4).
4. Réengager l'embase de montage (7) dans le boîtier (5), remettre la vis de fixation (4) en place. Engager la prise de courant sur le pressostat et serrer fermement la vis de fixation (4).
5. Procéder aux vérifications suivantes:
   - Le câblage correspond-il au schéma de la figure 4?
   - Les câblages sont-ils posés sans risque d'écrasement?
   - Les coudes dynamométriques (Fig. 3) sont-ils respectés?

Veiller à ce que le joint profilé (6) soit correctement positionné et à ce que le raccord Pg (8) soit en place comme il faut, faute de quoi l'indice de protection spécifié (IP65) ne serait pas obtenu.

Mise en service

1. Dévisser la vis de fixation (4) et la retirer.
2. Relier les bornes 1 et 4 avec un multimètre (Fig. 4).

Si l'on se sert d'une lampe en tant que contrôleur de passage, il faut veiller à respecter la puissance de commutation maximale admise (voir caractéristiques techniques).

3. Tout d'abord visser la vis de réglage (3) à fond.
   Utiliser pour cela un tournevis avec une largeur de lame de 2,5 mm.
4. Alimenter le pressostat avec la pression de commutation souhaitée (un manomètre de contrôle est nécessaire).

Tenir compte du fait que la vis de réglage (4) n'a une butée que pour le serrage.

5. Dévisser la vis de réglage (3) jusqu' à ce que le pressostat commute (la lampe de contrôle réagit).
6. Corriger le cas échéant la pression de commutation en agissant en conséquence sur la vis de réglage (3).
7. Engager finalement la prise de l'appareil sur le pressostat (respecter le schéma de raccordement).

Le réglage des seuills de contact selon les points 3, 4, 5 et 6 ci-dessus peut également être entrepris, la prise de courant étant engagée sur le pressostat. Pour cela, oter la vis de fixation (4). On aura ainsi accès à la vis de réglage (3), avec un tournevis d'une largeur de lame de 2,5 mm, introduit par cet orifice à l'intérieur de la prise.
Procéder comme décrit points 3, 4, 5 ci-dessus.

A la mise en service du pressostat, tenir compte des prescriptions et directives correspondantes données par les Chambres syndicales concernées, ainsi que les dispositions nationales respectives.

Le réglage de l'hystérésis est fait par l'usine. Une utilisation abusive pourrait endommager le pressostat.

Démontage

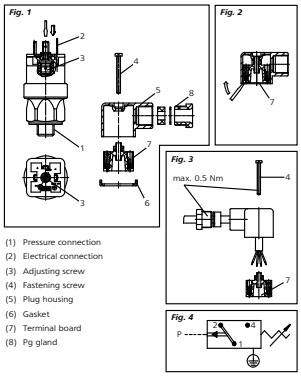
Avant de démonter le pressostat il est très important de tenir compte des points suivants:

- Il est impératif que le système sur lequel le pressostat est monté soit au préalable mis hors pression et hors tension.
- A l'aide d'une clé plate de 27 (DIN 894 ou analogue), dévisser par l'embout 6 pans le pressostat du raccord de pression sur lequel il a été monté.
- De même, les prescriptions inhérentes à la sécurité doivent impérativement être respectées.

Ne jamais dévisser le pressostat en le saisissant par ses parties en plastique, faute de quoi on encourt le risque de l'endommager.

Cable screw coupling:	Pg 9
Connector with LED:	Pg 11
Cable size:	Pg 9: 6 to 9 mm Pg 11: 6 to 11 mm
Operating frequency:	< 200 min^{-1}
Switching hysteresis: by the factory	10 to 30% adjustable
Mechanical life Diaphragm type (0184):	10^8 operating cycles (at a trip pressures up to 50 bar)
Piston type (0184):	10^6 operating cycles
Body material:	Zinc-plated steel (Fe//ZnNi(12)6//A/T2)
Temperature range:	NBR -40 °C to +100 °C EPDM -30 °C to +120 °C FKM -5 °C to +120 °C
Overpressure safety Diaphragm Pressure Switch (0184):	100 bar (0.3 to 1.5 bar) 300 bar (residual pressure)
Piston Pressure Switch (0185):	600 bar

Operating controls and connections



(1) Pressure connection
(2) Electrical connection
(3) Adjusting screw
(4) Fastening screw
(5) Plug housing
(6) Gasket
(7) Terminal board
(8) Pg gland

Installation

Mechanical, pneumatic, hydraulic
With a size 27 open-ended wrench (to DIN 894 or similar), install the pressure switch, by means of the hexagon connector, in the corresponding pressure socket (for torque specification, see following table).

For sealing the system, use a standard copper gasket of the appropriate dimensions.

Caution: Do not secure the pressure switch by means of the plastic components under any circumstances; otherwise they may be damaged beyond further use.

Connecting thread	Torque
M10 x 1 tap. and NPT 1/8	Tighten until system is hermetically sealed
M10 x 1 cyl.	35 Nm
Remaining	45 Nm

Electrical:
Use the connector supplied.
Take care to ensure that the cable is laid in such a way that it is not:
- pinched
- kinked
- under tension.

Connection to the connector:

1. Remove the fastening screws (4) from the head end (set aside for later use).
2. Remove the released terminal board (7) (Fig. 2).
3. Connect the cable (max. lead cross-section 1.5 mm²) to the screw terminals provided (Fig. 4).
4. Reinstall the terminal board (7) in the plug housing (5). Install the fastening screw (4). Install the connector on the pressure switch and tighten the fastening screw (4).
5. Pay attention to the following points:
   - Wiring in accordance with connection diagramm (Fig. 4)
   - Cabling laid free of pinchin, chafing, etc.
   - Torque specifications (Fig. 3)

Take care to ensure that the gasket (6) and Pg gland (8) are correctly installed, otherwise the conditions specified for protection category IP65 will not be achieved.

Entry into service

1. Remove out the connector.
2. Using a continuity tester, wire up the electrical connections 1 and 4 (Fig. 4).

If using a testing lamp as a continuity tester, observe the maximum permissible switching capacity (see Technical Data).

3. First screw in the adjusting screw (3) as far as it will go.To adjust the pressure switch, use a screwdriver with a 2,5 mm wide blade.
4. Adjust the pressure switch to the desired switching pressure (a test pressure gauge required).

Take care to ensure that the adjusting screw (3) does not seize at any point other than when it is fully tightened down.

5. Ease off the adjusting screw (3) to a sufficient extent to cause the pressure switch to trip (continuity tester reacts).
6. If necessary, adjust the trip pressure setting by turning the adjusting screw (3).
7. Push the connector onto the pressure switch (observe the connection diagram).

Adjustment of the trip pressure setting in accordance with points 3, 4, 5 and 6 can also be carried out with the connector installed.
In this case, first remove the fastening screw (4). With a screwdriver (Bladewidth 2,5 mm), you can now reach the adjusting screw (3) through the aperture in the connector.
Now proceed in accordance with points 3, 4, 5 and 6 above.

When putting the pressure switch into service, please observe the applicable safety regulations laid down by the governing bodies in the country of use.

The adjustment of hysteresis can only be carried out in the factory. If this is unexpertly undertaken, damage may be caused to the pressure swich.

Removing the pressure switch

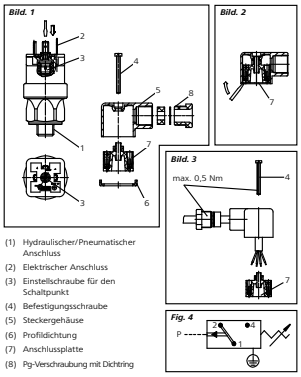
When removing the pressure switch, observe the following important instructions:

- The pressurized system from which the pressure switch is intended to be removed must be entirely relieved of pressure.
- All the relevant safety regulations must be observed.
- Use a size 27 open-ended wrench (to DIN 894 or similar), to remove the pressure switch.

Do not attempt to turn the switch by means of the plastic collars, otherwise it could be damaged beyond further use.

Kabelverschraubung:	Pg 9
Gerätesteckdose mit LED:	Pg 11
Klemmbereich:	Pg 9: 6 bis 9 mm Pg 11: 6 bis 11 mm
Schalthäufigkeit:	<200 min^{-1}
Schalthysterese:	10 bis 30% im Werk einstellbar
Mechanische Lebensdauer Membranausführung (0184):	10^8 Schaltspiele (bei Schaltdrücken bis 50 bar)
Kolbenausführung (0184):	10^6 Schaltspiele
Gehäusewerkstoff:	verzinkter Stahl (Fe//ZnNi(12)6//A/T2)
Temperaturbeständigkeit:	NBR -40 °C bis +100 °C EPDM -30 °C bis +120 °C FKM -5 °C bis +120 °C
Überdrucksicherheit Membrandruckschalter (0184):	100 bar (0,3 bis 1,5 bar) 300 bar (restl. Druckbereiche)
Kolbendruckschalter (0185):	600 bar

Bedienteile und Anschlüsse



(1) Hydraulischer/Pneumatischer Anschluss
(2) Elektrischer Anschluss
(3) Einstellschraube für den Schaltpunkt
(4) Befestigungsschraube
(5) Steckergehäuse
(6) Profildichtung
(7) Anschlussplatte
(8) Pg-Verschraubung mit Dichtring

Einbau

Mechanisch, pneumatisch, hydraulisch:
Drehen Sie den Druckschalter an dem sechskantförmigen Ansatz mit einem Maulschlüssel der Schlüsselweite 27 (nach DIN 894 o.ä.) in den vorgesehenen Druckanschluss (Anzugsdrehmomente siehe nachfolgende Tabelle).

Zum Abdichten des Systems verwenden Sie einen Standard-Kupferdichtring mit den entsprechenden Abmessungen.

Achtung: niemals den Druckschalter an den Kunststoffteilen mechanisch belasten. Zerstörungsgefahr!

Anschlussgewinde	Drehmoment
M10 x 1 kegl. und NPT 1/8	Einschrauben bis System abgedichtet ist
M10 x 1 zyl.	35 Nm
Restliche	45 Nm

Elektrisch:
Verwenden Sie die mitgelieferte Gerätesteckdose.
Stellen Sie sicher, dass das Kabel
- quetschfrei,
- knickfrei,
- dehnungsfrei verlegt ist.

Verkabelung des Gerätesteckdose:

1. Lösen Sie die Befestigungsschraube (4), und ziehen Sie diese am Kopf ende ganz heraus (gut aufbewahren)
2. Demontieren Sie die gelöste Anschlussplatte (7) (Bild 2).
3. Schließen Sie die Kabel (max. Leistungsquerschnitt 1,5 mm²) an den dafür vorgesehenen Schraubklemmen an (Bild 4).
4. Anschlussplatte (7) wieder in das Steckergehäuse (5) schieben. Befestigungsschraube (4) montieren. Gerätesteckdose auf den Druckschalter stecken und Befestigungsschraube (4) anziehen.
5. Achten Sie auf folgende Punkte:
   - Verkabelung nach Anschlussbild (Bild 4)
   - quetschfreie Kabelführung
   - Anzugsdrehmomente (Bild 3)

Achten Sie auf die ordnungsgemäße Lage der Profildichtung (6) und auf eine sachgemäße Montage der Pg-Verschraubung (8), da sonst die Schutzart IP65 nicht erreicht wird.

Inbetriebnahme

1. Lösen Sie die Befestigungsschraube (4), und ziehen Sie die Gerätesteckdose ab.
2. Verkabeln Sie die elektrischen Anschlüsse 1 und 4 mit einem Durchgangsprüfer (Bild 4).

Bei Verwendung einer Prüflampe als Durchgangsprüfer: Achten Sie auf die max. zulässige Schaltleistung(siehe technische Daten).

3. Drehen Sie die Einstellschraube (3) zunächst ganz ein. Verwenden Sie zum Einstellen des Druckschalters einen Schraubendreher mit 2,5 mm Klingenbreite.
4. Beaufschlagen Sie den Druckschalter mit dem gewünschten Schaltdruck (Kontrollmanometer erforderlich).

Beachten Sie bitte, dass die Einstellschraube (3) nur beim Eindrehen einen Anschlag besitzt.

5. Drehen Sie die Einstellschraube (3) so weit heraus, bis der Druckschalter umschaltet (Durchgangsprüfer reagiert).
6. Korrigieren Sie gegebenenfalls den Schaltdruck durch Verdrehen der Einstellschraube (3).
7. Schieben Sie die Gerätesteckdose auf den Druckschalter (Anschlussbild beachten).

Das Einstellen des Schaltpunkts nach den Punkten 3, 4, 5 und 6 kann auch mit aufgesetzter Gerätesteckdose durchgeführt werden.
Hierzu entfernen Sie bitte die Befestigungsschraube (4). Nun können Sie mit einem Schraubendreher (Klingenbreite 2,5 mm) durch die Durchgangsbohrung der Gerätesteckdose die Einstellschraube (3) erreichen.
Verfahren Sie nun wie in Punkt 3, 4, 5 und 6 des Kapitels „Inbetriebnahme" beschrieben.

Bei Inbetriebnahme des Druckschalters beachten Sie bitte die entsprechenden Sicherheitsvorschriften der Berufsgenossenschaft oder die entsprechenden nationalen Bestimmungen.

Die Einstellung der Hysterese ist nur werkseitig durchführbar. Bei unsachgemäßer Vorgehensweise kann der Druckschalter beschädigt werden.

Ausbau

Beachten Sie folgende wichtige Punkte beim Ausbau des Druckschalters:

- Das Drucksystem, aus dem der Druckschalter ausgebaut werden soll, muss sich im drucklosen Zustand befinden.
- Es müssen alle relevanten Sicherheitsbestimmungen beachtet werden.
- Drehen Sie den Druckschalter mit einem Maulschlüssel der Schlüsselweite 27 (nach DIN 894 o.ä.) aus dem Druckanschluss.

Drehen Sie den Druckschalter niemals an den Kunststoffansätzen heraus, da Zerstörungsgefahr für den Druckschalter besteht.

Mechanical pressure measurement

Bourdon tube pressure gauge
Model 213.53, liquid filling, stainless steel case

WIKA data sheet PM 02.12

for further approvals
see page 2

Applications

- For measuring points with high dynamic pressure loads or vibrations
- For gaseous and liquid media that are not highly viscous or crystallising and will not attack copper alloy parts
- Hydraulics
- Compressors, shipbuilding

Special features

- Vibration and shock resistant
- Especially sturdy design
- NS 63 and 100 with German Lloyd and Gosstandart approval
- Scale ranges up to 0 ... 1,000 bar

Bourdon tube pressure gauge, model 213.53.100, lower mount

Description

Design
EN 837-1

Nominal size in mm
50, 63, 100

Accuracy class
NS 50, 63: 1.6
NS 100: 1.0

Scale ranges
NS 50: 0 ... 1 to 0 ... 400 bar
NS 63, 100: 0 ... 0.6 to 0 ... 1,000 bar
or all other equivalent vacuum or combined pressure and vacuum ranges

Pressure limitation

NS 50, 63:	Steady:	3/4 x full scale value
	Fluctuating:	2/3 x full scale value
	Short time:	Full scale value
NS 100:	Steady:	Full scale value
	Fluctuating:	0.9 x full scale value
	Short time:	1.3 x full scale value

Permissible temperature
Ambient: -20 ... +60 °C
Medium: +60 °C maximum

Temperature effect
When the temperature of the measuring system deviates from the reference temperature (+20 °C):
Max. ±0.4 %/10 K of the span

Ingress protection
IP 65 per EN 60529 / IEC 60529

Data sheets showing similar products:
Standard version with liquid filling; model 113.53; see data sheet PM 01.08

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SEW EURODRIVE

Standard version

Process connection
Copper alloy,
lower mount (LM) or back mount (BM),
NS 50, 63: G ¼ B (male), 14 mm flats
NS 100: G ½ B (male), 22 mm flats

Pressure element
NS 50:
Copper alloy, C-type or helical type

NS 63:
≤ 400 bar: Copper alloy, C-type or helical type
> 400 bar: Stainless steel 316L, helical type

NS 100:
< 100 bar: Copper alloy, C-type
≥ 100 bar: Stainless steel 316L, helical type

Movement
Copper alloy

Dial
NS 50, 63: Plastic ABS, white, with pointer stop pin
NS 100: Aluminium, white, black lettering

Pointer
NS 50, 63: Plastic, black
NS 100: Aluminium, black

Window
Plastic, crystal-clear

Case
Natural finish stainless steel, with blow-out device with
NS 50: in case back, 12 o'clock
NS 63, 100: at case circumference, 12 o'clock
O-ring seal between case and connection.
Scale ranges ≤ 0 ... 16 bar with compensating valve to vent case.

Bezel ring
Crimp ring, glossy finish stainless steel, triangular bezel

Filling liquid
Glycerine

Options

- Other process connection
- Sealings (model 910.17, see data sheet AC 09.08)
- Measuring system and movement from stainless steel (model 233.53)
- NS 100: Zero adjustment (in front)
- Increased medium temperature with special soft solder
  - NS 50, 63: 100 °C
  - NS 100: 150 °C
- Ambient temperature resistant -40 ... +60 °C with silicone oil filling
- NS 50: Higher scale ranges up to 0 ... 1,000 bar
- Panel mounting flange, stainless steel, for back connection
- Surface mounting flange, stainless steel (not NS 50)
- Mounting clamp (for back connection)

CE conformity

Pressure equipment directive
97/23/EC, PS > 200 bar, module A, pressure accessory

Approvals

- **GL**, ships, shipbuilding (e.g. offshore), Germany
- **EAC**, import certificate, customs union Russia/Belarus/Kazakhstan
- **GOST**, metrology/measurement technology, Russia
- **KBA,** automotive, European Community
- **CRN**, safety (e.g. electr. safety, overpressure, ...), Canada

Certificates [1)]

- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)
- 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)

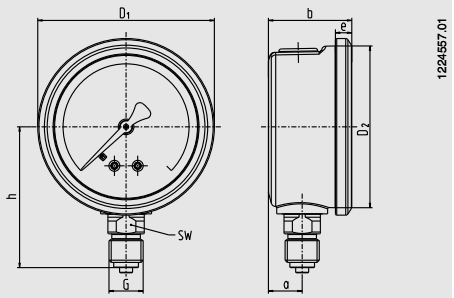
1) Option

Approvals and certificates, see website

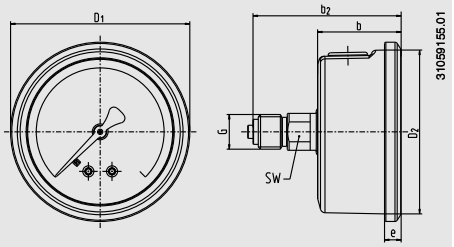
Dimensions in mm

Standard version

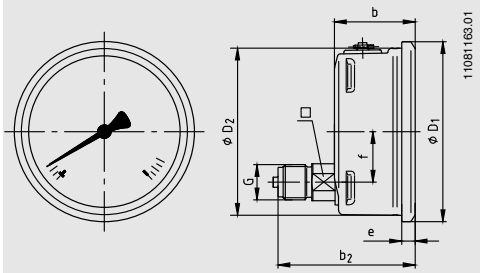
Lower mount (LM)



NS 50, 63, centre back mount (CBM)



NS 100, lower back mount (LBM)



NS	Dimensions in mm										Weight in kg
	a	b ±0.5	b_2 ±0.5	D_1	D_2	e	f	G	h ±1	SW	
50	12	30	55	55	50	5.5	-	G ¼ B	48	14	0.15
63	13	32	56	68	62	6.5	-	G ¼ B	54	14	0.21
100	15.5	48	81.5	107	100	8	30	G ½ B	87	22	0.80

Process connection per EN 837-1 / 7.3

Ordering information

Model / Nominal size / Scale range / Connection size / Connection location / Options

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. +49 9372 132-0
Fax +49 9372 132-406
info@wika.de
www.wika.de

Mechanical temperature measurement

Bimetal thermometer Model 52, industrial series

WIKA data sheet TM 52.01

for further approvals see page 6

Applications

- A wide range of applications in machine building, vessel, piping and apparatus construction
- Heating technology

Special features

- Scale ranges from -30 ... +500 °C
- Large choice of nominal sizes from 25 ... 160 mm
- Case and stem from stainless steel
- 5 different connection designs

Fig. left: model A52.100, back mount
Fig. right: model R52.100, lower mount

Description

The model 52 bimetal thermometer is the entry-level model among process thermometers. The target markets of this thermometer are air-conditioning and machine building.

Model 52 is manufactured in accordance with EN 13190 and already offers a stainless steel case and accuracy class 1 for nominal sizes > 60 mm.

Especially noteworthy is the large number of stem lengths and nominal sizes. This enables the individual adaptation to the target applications.

23055324/FR – 05/2019

Standard version

Measuring element
Bimetal coil

Nominal size in mm
25, 33, 40, 50, 63, 80, 100, 160

Connection designs
S Standard (male threaded connection)
1 Plain stem (without thread)
2 Male nut [1)]
3 Union nut [1)]
4 Compression fitting (sliding on stem) [1)]

1) Not for NS 25, 33, 40, 50

Model overview

Model	NS	Design
A52.025	25	Back mount (axial)
A52.033	33	
A52.040	40	
A52.050	50	
A52.063	63	
A52.080	80	
A52.100	100	
A52.160	160	
R52.063	63	Lower mount (radial)
R52.080	80	
R52.100	100	
R52.160	160	

Accuracy class
NS 25, 33: ±5 % of scale range
NS 40, 50: 2 per EN 13190
NS 63, 80, 100, 160: 1 per EN 13190

Working range
Continuous loading: Measuring range per EN 13190
Short time (24 h max.): Scale range per EN 13190

Case, bezel ring, stem, process connection and spacer
Stainless steel

Elbow behind the case
Aluminium, only with lower mount version

Dial
Aluminium, white, black lettering

Window
Instrument glass
NS 33: polycarbonate

Pointer
NS 25, 33, 40: Aluminium, black
NS 50, 63, 80, 100, 160: Aluminium, black, adjustable pointer

Permissible operating pressure at the stem
NS 25, 33, 40, 50: max. 6 bar, static
NS 63, 80, 100, 160: max. 25 bar, static

Ingress protection
NS 25, 33, 40: IP54 per EN 60529 / IEC 529
NS 50, 63, 80, 100, 160: IP43 per EN 60529 / IEC 529

Options

- Scale range °F, °C/°F (dual scale)
- Other scale ranges
- Other connection types

23055324/FR – 05/2019

Scale ranges, measuring ranges [2], error limit (EN 13190)
Scale graduation per WIKA standard

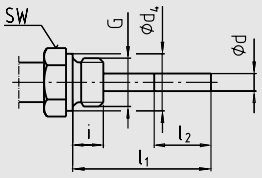
Scale range in °C	Measuring range in °C	Scale spacing in °C		Error limit ±°C	
		up to NS 63	from NS 80	up to NS 50	from NS 63
-30 ... +50	-20 ... +40	1	1	2	1
-20 ... +60	-10 ... +50	1	1	2	1
0 ... 60	10 ... 50	1	1	2	1
0 ... 80	10 ... 70	1	1	2	1
0 ... 100	10 ... 90	2	1	2	1
0 ... 120	10 ... 110	2	1	4	2
0 ... 160	20 ... 140	2	2	4	2
0 ... 200 [3]	20 ... 180	5	2	4	2
0 ... 250 [3]	30 ... 220	5	2	5	2.5
0 ... 300 [4]	30 ... 270	5	2	-	5
0 ... 400 [4]	50 ... 350	5	5	-	5
0 ... 500 [4]	50 ... 450	5	5	-	5

2) The limits of the measuring range are indicated on the dial by two triangular marks. Only within this range is the stated error limit valid per EN 13190.
3) Not for NS 33
4) Not for NS 25 to NS 50

Connection designs

Standard design (male thread connection)
Standard insertion length l_1 = 63, 100, 160, 200, 250 mm

Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	Ø d_4	Ø d
25, 33	M8 x 1.25	8	12	-	4
	G ⅛ B	8	12	-	4
	G ¼ B	8	17	-	4
40, 50	M8 x 1.25	8	12	-	4
	G ⅛ B	8	17	-	4
	G ¼ B	8	17	-	4
	G ½ B	12	22	-	4
63, 80, 100, 160	G ¼ B	12	19	18	6 or 8
	G ½ B	14	27	26	6 or 8
	M18 x 1.5	12	24	23	6 or 8
	½ NPT	19	22	-	6 or 8



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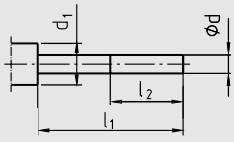
Legend:
G Male thread
i Thread length
Ø d_4 Diameter of the sealing collar
SW Spanner width
Ø d Stem diameter
l_2 Active length

Bauform 1, Anschluss glatt (ohne Gewinde)
Standard-Einbaulänge l_1 = 45, 63, 100, 140, 160, 200, 240, 290 mm

Nominal size	Dimensions in mm	
NS	d_1	Ø d
25, 33	8	4
40, 50	12	4
63, 80, 100, 160	18	6 or 8

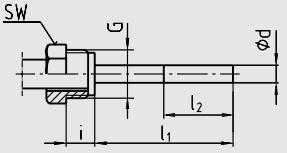


30730050.05

Legend:
Ø d_1 Bunddurchmesser
Ø d Stem diameter
l_2 Active length

Design 2, male nut
Standard insertion length l_1 = 80, 140, 180, 230 mm

Nominal size	Process connection		Dimensions in mm	
NS	G	i	SW	Ø d
63, 80, 100, 160	G ½ B	20	27	6 or 8
	M18 x 1.5	17	22	6 or 8

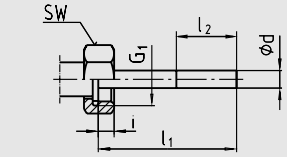


3073050.05

Legend:
G Male thread
i Thread length incl. collar
SW Spanner width
Ø d Stem diameter
l_2 Active length

Design 3, union nut
Standard insertion length l_1 = 89, 126, 186, 226, 276 mm

Nominal size	Process connection		Dimensions in mm	
NS	G	i	SW	Ø d
63, 80, 100, 160	G ½	8.5	27	6 or 8
	G ¾	9.5	32	6 or 8

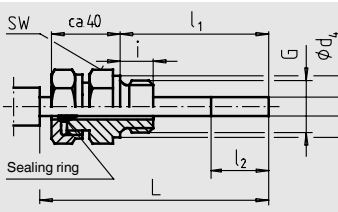


3073050.05

Legend:
G_1 Female thread
i Thread length
SW Spanner width
Ø d Stem diameter
l_2 Active length

Design 4, compression fitting (sliding on stem)
Insertion length l_1 = variable
Length L = l_1 + 40 mm

Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	Ø d_4	Ø d
63, 80, 100, 160	G ¼ B	8	22	18	6 or 8
	G ½ B	14	27	26	6 or 8
	M18 x 1.5	12	24	23	6 or 8
	½ NPT	19	22	-	6 or 8
	G ¾ B	16	32	32	6 or 8
	¾ NPT	20	30	-	6 or 8



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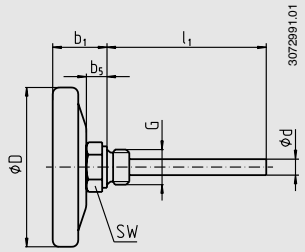
Legend:
G Male thread
i Thread length
Ø d_4 Diameter of the sealing collar
SW Spanner width
Ø d Stem diameter
l_2 Active length

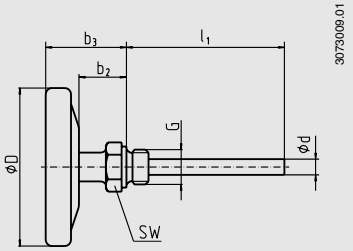
23055324/FR – 05/2019

Dimensions in mm

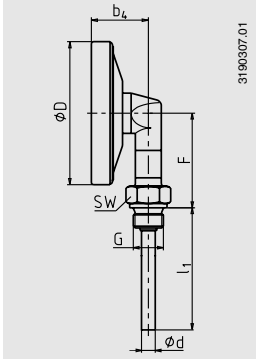
Back mount (BM)
(up to 250 °C)



Back mount with spacer
(from 300 °C or on request)



Lower mount (LM)



NS	Dimensions in mm							Weight in kg		
	b_1	b_2	b_3	b_4	b_5	Ø D	F	R	RD	U
25	16	-	-	-	6	25	-	0.035	-	-
33	16	-	-	-	6	33	-	0.040	-	-
40	21	-	-	-	8	40	-	0.050	-	-
50	21	-	-	-	8	50	-	0.060	-	-
63	29	30 [1)]	46	34	13	63	47	0.160	0.200	0.220
80	30	30 [1)]	47	36	13	80	56	0.200	0.240	0.270
100	35	30 [1)]	52	40	13	100	66	0.250	0.290	0.330
160	39	30 [1)]	57	42,5	13	160	96	0.450	0.490	0.560

1) from 300 °C or on request
R Back mount (BM)
RD Back mount with spacer
U Lower mount (LM)

Thermowell

In principle, the operation of a mechanical thermometer without a thermowell with low process-side loading (low pressure, low viscosity and low flow velocities) is possible.

However, in order to enable exchanging the thermometer during operation (e.g. instrument replacement or calibration) and to ensure a better protection of the instrument and also the plant and the environment, it is advisable to use a thermowell from the extensive WIKA thermowell portfolio.

For further information on the calculation of the thermowell, see Technical information IN 00.15.

Approvals

Logo	Description	Country
	GOST (option) Metrology, measurement technology	Russia
-	**CRN (option)** Safety (e.g. electr. safety, overpressure, ...)	Canada

Certificates (option)

2.2 test report

Approvals and certificates, see website

Ordering information
Model / Connection design / Scale range / Process connection / Stem diameter, material / Insertion length / Options

01/2016 EN

WIKA Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Tel. +49 9372 132-0
Fax +49 9372 132-406
info@wika.de
www.wika.de

23055324/FR – 05/2019

ifm electronic

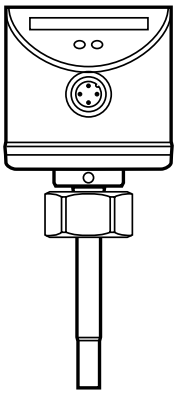
CE

Operating instructions
Flow monitors

efector300

UK

SI5000
SI5001



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23055324/FR – 05/2019

Contents

2

23055324/FR – 05/2019

Preliminary note

- An instruction is indicated by "▶":
  Example: ▶ Check whether the unit operates correctly.
- A reaction to the action is indicated by ">":
  Example: > LED 9 lights.

1 Safety instructions

UK

- Please read the product description prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.
- The unit conforms to the relevant regulations and EC directives.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application.
- That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.

For the scope of validity cULus:

The device shall be supplied from an isolating transformer having a secondary Listed fuse rated as noted in the following table.

Overcurrent protection		
Control-circuit wire size		Maximum protective device rating Ampere
AWG	(mm^2)	
26	(0.13)	1
24	(0.20)	2
22	(0.32)	3
20	(0.52)	5
18	(0.82)	7
16	(1.3)	10

23055324/FR – 05/2019

2 Functions and features

2.1 Application area

The unit monitors the flow of liquid and gaseous media.

2.2 Operating principle flow monitoring

- The unit detects the flow speed to the calorimetric measuring principle and switches the output:
  - output closed if medium is flowing / output open if no medium is flowing.
  This applies to the unit on delivery: output = normally open. In case of need you can change the output to normally closed (→ 7.2). It then applies: output open if medium is flowing.
- If the flow speed increases, the switching status changes when the switch point is reached.
- If the flow speed falls again, the switching status changes if the value "SP minus hysteresis" is reached.
  The hysteresis changes with the flow speed and it is essentially influenced by the set monitoring range.
  It is 2...5 cm/s for the setting 5...100 cm/s (= factory setting), it increases with higher flow speeds.
- The typical response time of the unit is 1...10 s. It can be influenced by the setting of the switch point:
  - Low switch point = quick reaction with rising flow.
  - High switch point = quick reaction with falling flow.

4

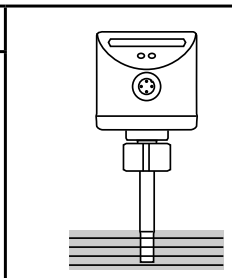
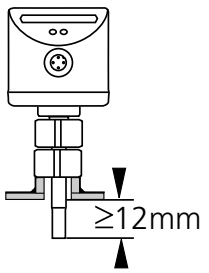
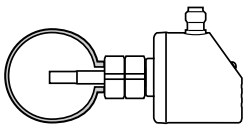
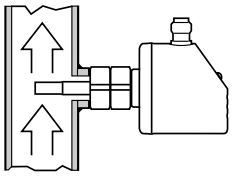
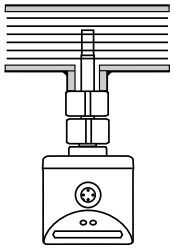
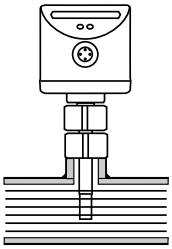
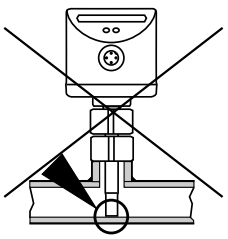
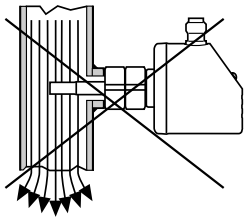
23055324/FR – 05/2019

3 Installation

Using process adapters the unit can be adapted to different process connections.

- Adapters have to be ordered separately as accessories.
  A correct fit of the unit and ingress resistance of the connection are only ensured using ifm adapters.
- For small flow rates ifm adapter blocks are available.

3.1 Installation location

General • The sensor tip is to be completely surrounded by the medium. • Insertion depth of the sensor: minimum 12 mm.		
Recommended • For horizontal pipes: mounting from the side. • For vertical pipes: mounting in the rising pipe.		
Conditional • Horizontal pipe /mounting from the bottom: if the pipe is free from build-up. • Horizontal pipe /mounting from the top: if the pipe is completely filled with medium.		
To avoid • The sensor tip must not be in contact with the pipe wall. • Do not mount in downpipes that are open at the bottom!		

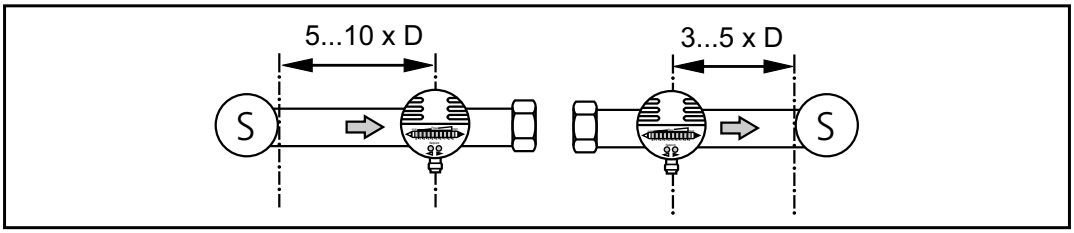
UK

23055324/FR – 05/2019

3.2 Sources of interference in the pipe system

Components integrated in the pipes, bends, valves, reductions, etc. lead to turbulence of the medium. This affects the function of the unit.

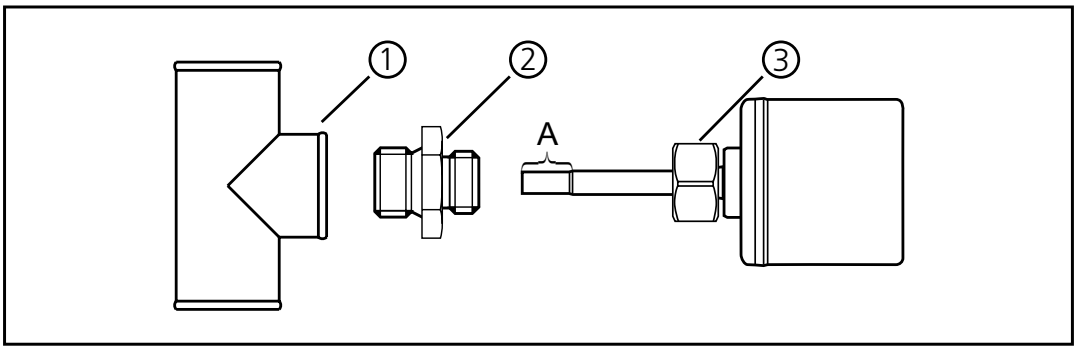
Recommendation: Adhere to the distances between sensor and sources of interference:



D = pipe diameter; S = sources of interference

3.3. Mounting operation

- ▶ Ensure that the system is free of pressure during installation.
- ▶ Ensure that no media can leak at the mounting location during installation.



- ▶ Grease the threads of the process connection (1), adapter (2) and nut (3).
  Note: The sensor tip (A) must not be in contact with grease.
- ▶ Screw the suitable adapter into the process connection.
- ▶ Place the flow monitor onto the adapter and tighten the nut. Tightening torque 25 Nm. Ensure that the unit is correctly oriented.

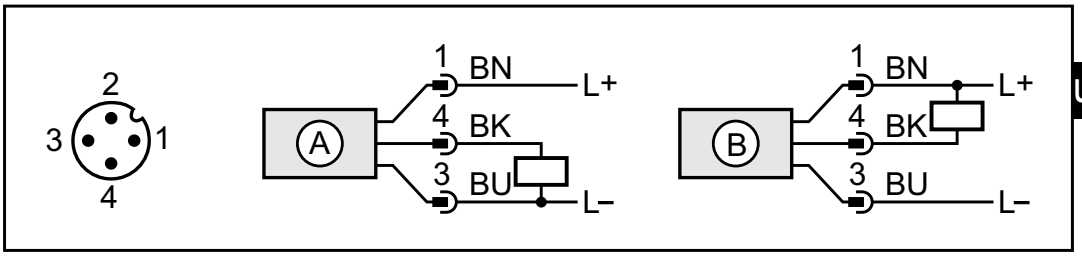
23055324/FR – 05/2019

4 Electrical connection

The unit must be connected by a qualified electrician.
The national and international regulations for the installation of electrical equipment must be adhered to.
Voltage supply to EN 50178, SELV, PELV.

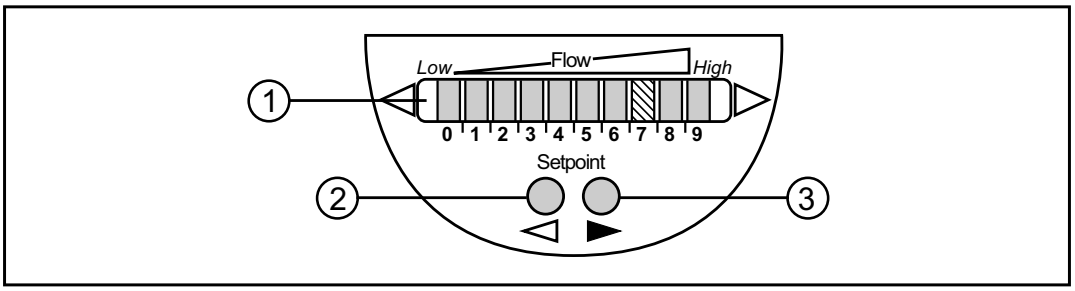
▶ Disconnect power.

▶ Connect the unit as follows:



A: SI5000 (positive switching); B: SI5001 (negative switching)
Core colours of ifm sockets:
1 = BN (brown), 3 = BU (blue), 4 = BK (black)

5 Operating and display elements

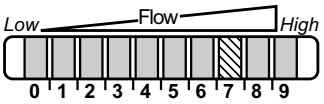
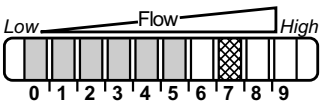
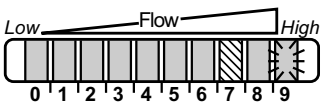


1: Operation display
• The green LEDs indicate the current flow (the LEDs 0 to 9 represent the range between no flow and maximum flow). • A lighting LED indicates the position of the switch point (orange = output closed, red = output open).
2, 3: Setting buttons for adjustment and configuration

6 Set-up and settings for water

(For media other than water → 7.1: Low flow adjustment).

▶ Switch on the supply voltage.
> All LEDs light and go out again step by step. During this time the output is closed (if configured as normally open). The unit is in the operating mode.
▶ Let the normal flow circulate in the installation.
▶ Check the display and determine further actions.

1		The factory setting is suitable for the application. ▶ No further settings are required.
2		Your normal flow is below the representation range of the display. 2 setting options: ▶ Change the switch point (→ 6.1). ▶ Carry out high flow adjustment (→ 6.2).
3		Your normal flow exceeds the representation range of the display (LED 9 flashes). ▶ Carry out high flow adjustment (→ 6.2).

You can restore the factory setting any time. (→ 7.3).

6.1 Change the switch point (optional)

For the factory setting the switch point is at LED 7. A change makes sense if:
- the display shows example 2.
- the flow fluctuates much or pulsates.
- if a faster response time of the unit is requested (low switch point = fast response with rising flow, high switch point = fast response with falling flow).

▶ Briefly press the pushbutton ◁ or ►.
> The switch point LED flashes.
▶ Press the pushbutton ◁ or ► as often as required. Each press of the pushbutton shifts the LED by one position in the indicated direction.

Note: If no pushbutton is pressed for 2 s, the unit returns to the operating mode with the newly set value.

8

23055324/FR – 05/2019

6.2 High flow adjustment (optional)

The unit determines the existing flow as normal flow and adapts the display representation (all LEDs except the switch point LED light green).

▶ Let the normal flow circulate in the installation.
▶ Press the pushbutton ► and keep it pressed.
> LED 9 lights, after approx. 5 s it flashes.
▶ Release the pushbutton.

The unit is now adapted to your flow conditions. It passes into the operating mode, the display should now show example 1.

UK

Note: The adjustment affects the switch point: It is increased proportionally (maximum up to LED 7).

7 Additional settings (optional)

7.1 Low flow adjustment

If the unit is used in media other than water, you should additionally adapt the unit to the minimum flow.

Note: The following adjustment must only be carried out after the high flow adjustment.

▶ Let the minimum flow circulate in the installation or ensure flow standstill.
▶ Press the pushbutton ◁ and keep it pressed.
> LED 0 lights, after approx. 5 s it flashes.
▶ Release the pushbutton. The unit adopts the new value and passes into the operating mode.

7.2 Configure the switching output

The unit is delivered as normally open. In case of need you can change the output to normally closed:

▶ Press the pushbutton ◁ for at least 15 s.
> LED 0 lights, after approx. 5 s it flashes.
> After 10 s the current setting is displayed: LEDs 5...9 light orange (= output normally open).
> After approx. 15 s LEDs 0...4 flash orange.
▶ Release the pushbutton. The output is changed to normally closed operation.

For a new changeover repeat the operation.

23055324/FR – 05/2019

7.3 Restore the factory setting (reset)

▶ Press the pushbutton ► for at least 15 s.
> LED 9 lights, after approx. 5 s it flashes.
> After approx. 15 s LEDs 0...9 flash orange.
▶ Release the pushbutton. All settings are reset to the factory setting:
- operating area: 5 ...100 cm/s for water
- switch point: LED 7
- output function: NO
- unlocked.

7.4 Lock / unlock the unit

The unit can be locked electronically to prevent unintentional settings.

▶ Press both setting pushbuttons simultaneously for at least 10 s in the operating mode.
> The indication goes out, the unit locks or unlocks.

On delivery: unlocked.

8 Error during adjustment

If no adjustment is possible, all LEDs flash red. The unit then passes into the operating mode with unchanged values.

Possible cause /aid:

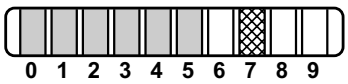
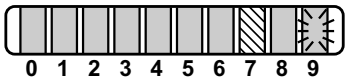
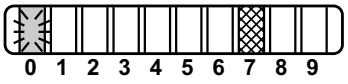
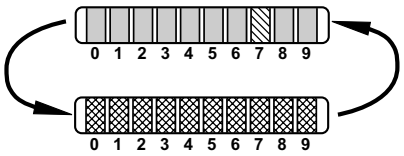
Error during installation.	▶ Read chapter 3 Installation. Check whether all requirements have been met.
The difference between maximum flow and minimum flow is too small.	▶ Increase the flow difference and carry out the adjustment once again.
The sequence high flow /low flow adjustment was not adhered to.	▶ Carry out the two adjustment operations again in the right sequence.

23055324/FR – 05/2019

9 Operation

After every power on all LEDs light and go out again step by step (during this time the output is closed if configured as normally open). The unit is then ready for operation.

In case of power failure or interruption all settings remain.

Operating indicators	
	Green LED bar: Current flow within the representation range. Indication of the switch point (SP): - LED orange: output closed. - LED red: output open.
	LED 9 flashes: current flow above the representation range.
	LED 0 flashes: current flow far below the representation range.
Interference indicators	
	Short circuit at the switching output: The operating indicator and red LEDs light alternately. If the short circuit has been rectified, the unit immediately passes into the normal operating state. The current operating state is displayed.
Display OFF (no LED lights):	Operating voltage too low (< 19 V) or failed. Ensure a correct voltage supply.

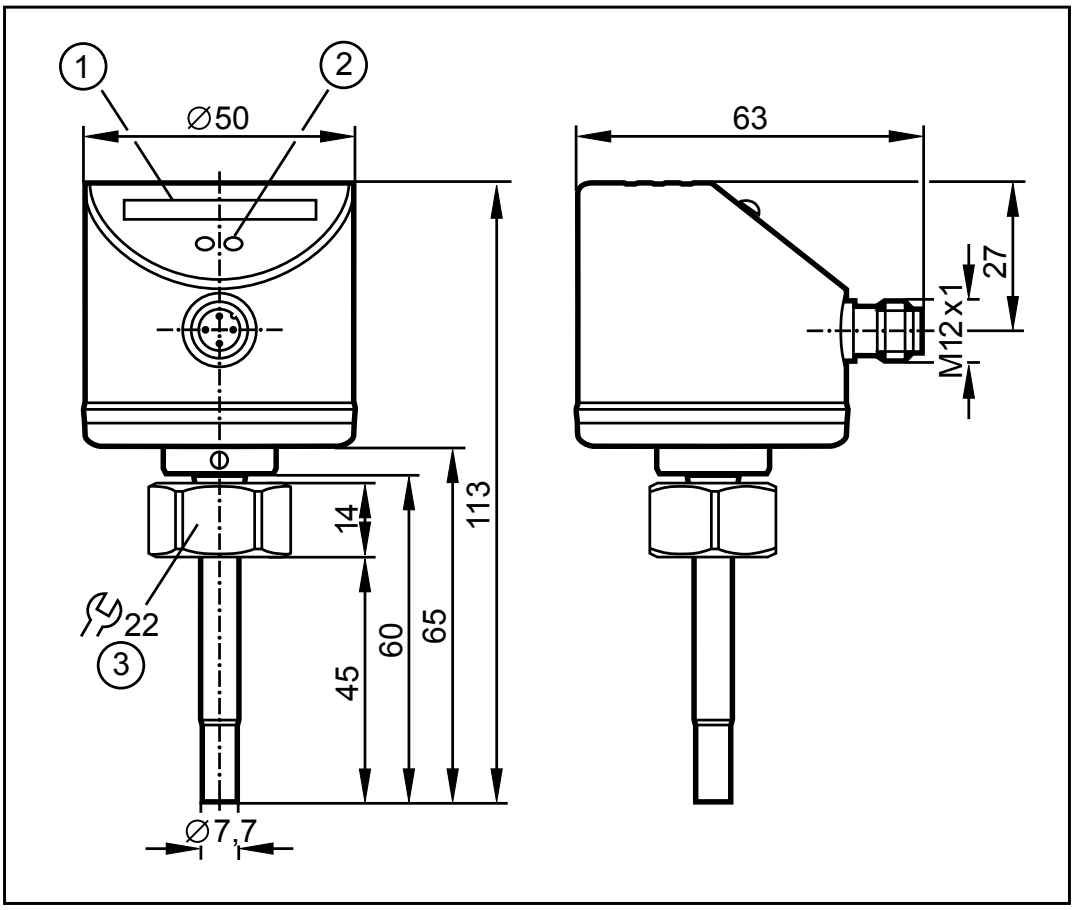
10 Maintenance

Recommended maintenance:

- ▶ Check the sensor tip for build-up from time to time.
- ▶ Clean it using a soft cloth. Stubborn build-up (e.g. lime) can be removed using a common vinegar cleaning agent.

23055324/FR – 05/2019

11 Scale drawing



1: LED bar display
2: set button
3: tightening torque 25 Nm

12 Technical data

Application area	Liquids and gases
Operating voltage [V]	19 ... 36 DC[1)]
Current rating [mA]	250
Short-circuit protection, pulsed; reverse polarity / overload protection	
Voltage drop [V]	< 2.5
Current consumption [mA]	< 60
Power-on delay time [s]	10, optically indicated

23055324/FR – 05/2019

Liquids	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s]	3 ... 300
Greatest sensitivity [cm/s]	3...100
Temperature gradient [K/min]	300
Gases	
Medium temperature [°C]	-25 ... +80
Setting range [cm/s]	200 ... 3000
Greatest sensitivity [cm/s]	200 ... 800
Switch point accuracy [cm/s]	± 2...± 10[2)]
Hysteresis [cm/s]	2...5[2)]
Repeatability [cm/s]	1...5[2)]
Temperature drift [cm/s x 1/K]	0.1[3)]
Response time [s]	1 ... 10
Pressure resistance [bar]	30
Operating temperature [°C]	-25 ... +80
Protection rating	IP 67
Protection class	III
Shock resistance [g]	50 (DIN / IEC 68-2-27, 11 ms)
Vibration resistance [g]	20 (DIN / IEC 68-2-6, 55-2000 Hz)
Housing materials	stainless steel 316L / 1.4404; stainless steel 304 / 1.4301; PC (Makrolon); PBT-GF 20; EPDM/X (Santoprene)
Materials (wetted parts)	stainless steel 316L / 1.4404; O-ring: FPM 8x1.5 gr 80° Shore A
EMC	
EN 61000-4-2 ESD:	4 kV CD / 8 kV AD
EN 61000-4-3 HF radiated:	10 V/m
EN 61000-4-4 Burst:	2 kV
EN 61000-4-6 HF conducted:	10 V

[1)] to EN50178, SELV, PELV;
[2)] for water; 5...100 cm/s; 25°C (factory setting)
[3)] for water; 5...100 cm/s; 10...70°C
The sensor conforms to the standard EN 61000-6-2

More information at www.ifm.com

UK

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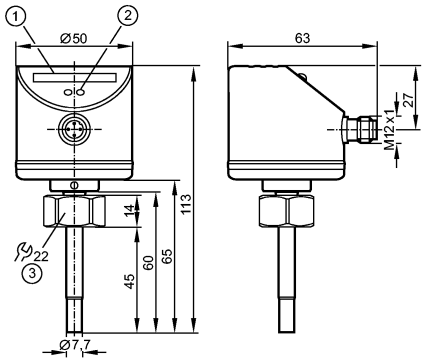
efector300

SI5000

SID10ABBFPKG/US-100

Flow sensors



1: LED display
2: setting pushbutton
3: tightening torque 25 Nm

Product characteristics		
Flow monitor		
Compact type for adapter		
Process connection: internal thread M18 x 1.5 for adapter		
Probe length: 45 mm		
Setting range: 3...300 cm/s (liquids)		
Application		
Application		liquids and gases
Pressure rating	[bar]	30
Medium temperature	[°C]	-25...80
Electrical data		
Electrical design		DC PNP
Operating voltage	[V]	19...36 DC
Current consumption	[mA]	< 60
Protection class		III
Reverse polarity protection		yes
Outputs		
Output function		normally open / closed programmable
Current rating	[mA]	250
Voltage drop	[V]	< 2.5
Short-circuit protection		pulsed
Overload protection		yes
Measuring / setting range		
Liquids		
Setting range	[cm/s]	3...300
Greatest sensitivity	[cm/s]	3...100
Gases		
Setting range	[cm/s]	200...3000
Greatest sensitivity	[cm/s]	200...800

23055324/FR – 05/2019

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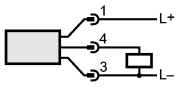
Flow sensors

Accuracy / deviations		
Switch point accuracy	[cm/s]	± 2...± 10 *)
Hysteresis	[cm/s]	2...5 *)
Repeatability	[cm/s]	1...5 *)
Temperature drift	[cm/s x 1/K]	0.1 **)
Max. temperature gradient of medium	[K/min]	300
Reaction times		
Power-on delay time	[s]	10
Response time	[s]	1...10
Software / programming		
Adjustment of the switch point		pushbuttons
Environment		
Ambient temperature	[°C]	-25...80
Storage temperature	[°C]	-25...100
Protection		IP 67
Tests / approvals		
EMC		EN 61000-4-2 ESD: 4 kV CD / 8 kV AD EN 61000-4-3 HF radiated: 10 V/m EN 61000-4-4 Burst: 2 kV EN 61000-4-6 HF conducted: 10 V
Shock resistance		DIN IEC 68-2-27: 50 g (11 ms)
Vibration resistance		DIN EN 60068-2-6 20 g (55...2000 Hz)
MTTF	[Years]	298
Mechanical data		
Process connection		internal thread M18 x 1.5 for adapter
Materials (wetted parts)		stainless steel 316L / 1.4404; O-ring: FKM 8 x 1.5 gr 80° Shore A
Housing materials		stainless steel 316L / 1.4404; stainless steel / 301 / 1.4310; PC (polycarbonate); PBT-GF 20; EPDM/X
Probe length L	[mm]	45
Weight	[kg]	0.235
Displays / operating elements		
Function display	LED	10 LEDs, three-colour
Electrical connection		
Connection		M12 connector

Wiring



Remarks		
Remarks		*) for water; 5...100 cm/s; 25°C (factory setting) **) for water; 5...100 cm/s; 10...70°C
Pack quantity	[piece]	1

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Flow sensors

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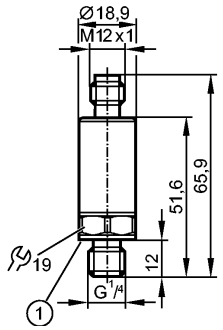
PT5403

PT-025-SEG14-A-ZVG/US/ /W

Pressure sensors



1: Process connection sealing FKM / DIN 3869

Product characteristics		
Electronic pressure sensor		
for industrial applications		
Process connection: G ¼ A (according to DIN EN ISO 1179-2)		
Analog output		
Measuring range: 0...25 bar		
Application		
Application		Type of pressure: relative pressure Group 2 fluids according to the Pressure Equipment Directive (PED), group 1 fluids on request
Pressure rating	[bar]	65 (static)
Bursting pressure min.	[bar]	600
Vacuum resistance	[mbar]	-1000
Medium temperature	[°C]	-40...90
Electrical data		
Electrical design		DC
Operating voltage	[V]	8.5...36 DC
Insulation resistance	[MΩ]	> 100 (500 V DC)
Protection class		III
Reverse polarity protection		yes
Outputs		
Output		Analog output
Output function		4...20 mA analog
Short-circuit proof		yes
Overload protection		yes
Analog output		4...20 mA
Max. load	[Ω]	(Ub - 8.5 V) / 21.5 mA; 720 at Ub = 24 V
Measuring / setting range		
Measuring range	[bar]	0...25
Accuracy / deviations		

Accuracy / deviations (in % of the span)

Characteristics deviation *)	< ± 0.5
Linearity	< ± 0.1 (BFSL) / < ± 0.2 (LS)
Hysteresis	< ± 0.2
Repeatability **)	< ± 0.05
Long-term stability ***)	< ± 0.1

Temperature coefficients (TEMPCO) in the temperature range -40...90° C (in % of the span per 10 K)

Greatest TEMPCO of the zero point + span	< 0.1 (-25...90 °C) / < 0.2 (-40...-25 °C)

Reaction times		
Step response time analogue output	[ms]	1

Environment		
Ambient temperature	[°C]	-40...90
Storage temperature	[°C]	-40...100
Protection		IP 67 / IP 69K

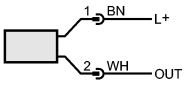
Tests / approvals			
Pressure equipment directive		sound engineering practice	
EMC		DIN EN 61000-6-2	
		DIN EN 61000-6-3	
Shock resistance		DIN EN 60068-2-27	50 g (11 ms)
Vibration resistance		DIN EN 60068-2-6	20 g (10...2000 Hz)
MTTF	[Years]	686	

Mechanical data		
Process connection		G ¼ A (according to DIN EN ISO 1179-2)
Process connection sealing		FKM (to DIN 3869)
Materials (wetted parts)		1.4542 (17-4 PH / 630)²
Housing materials		1.4542 (17-4 PH / 630)²; stainless steel (316L / 1.4404); PEI
Min. pressure cycles		60 millions in the course of the lifetime (at 1.2 times the nominal pressure)
Tightening torque	[Nm]	25...35 (recommended tightening torque¹)
Restrictor element integrated		no
Weight	[kg]	0.056

Electrical connection	
Connection	M12 connector

Wiring

Core colors
BN brown
WH white



OUT: 4...20 mA
The following pin connection is available on request:
pin 1: L+, pin 3: OUT
Colours to DIN EN 60947-5-2

Remarks	
Remarks	*) incl. drift when overtightened, zero point and span error, non-linearity, hysteresis **) with temperature fluctuations < 10 K ***) in% of the span / 6 months

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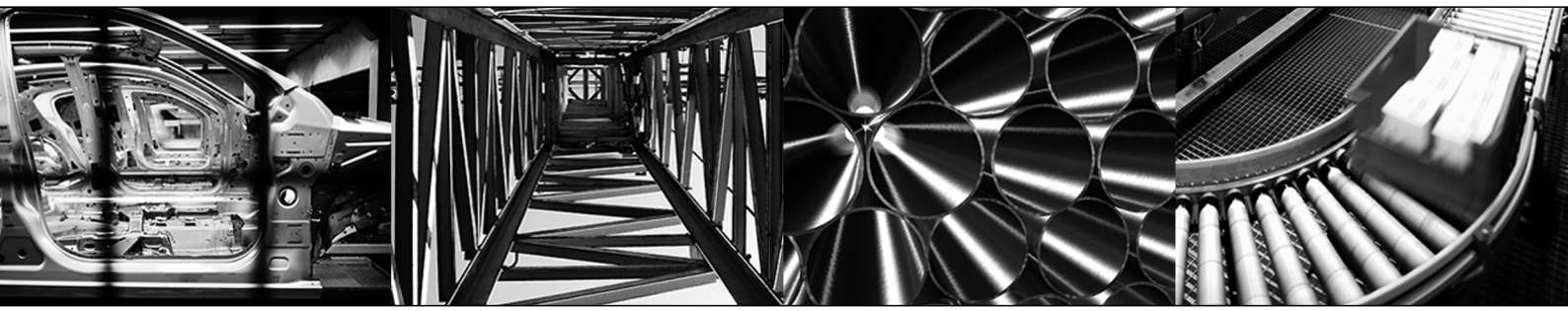
		¹) Depends on lubrication, seal and pressure rating ²) Characteristics similar to stainless steel (e.g. 304/1.4301) but higher strength. BFSL = Best Fit Straight Line / LS = Limit Value Setting
Pack quantity	[piece]	1

23055324/FR – 05/2019



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