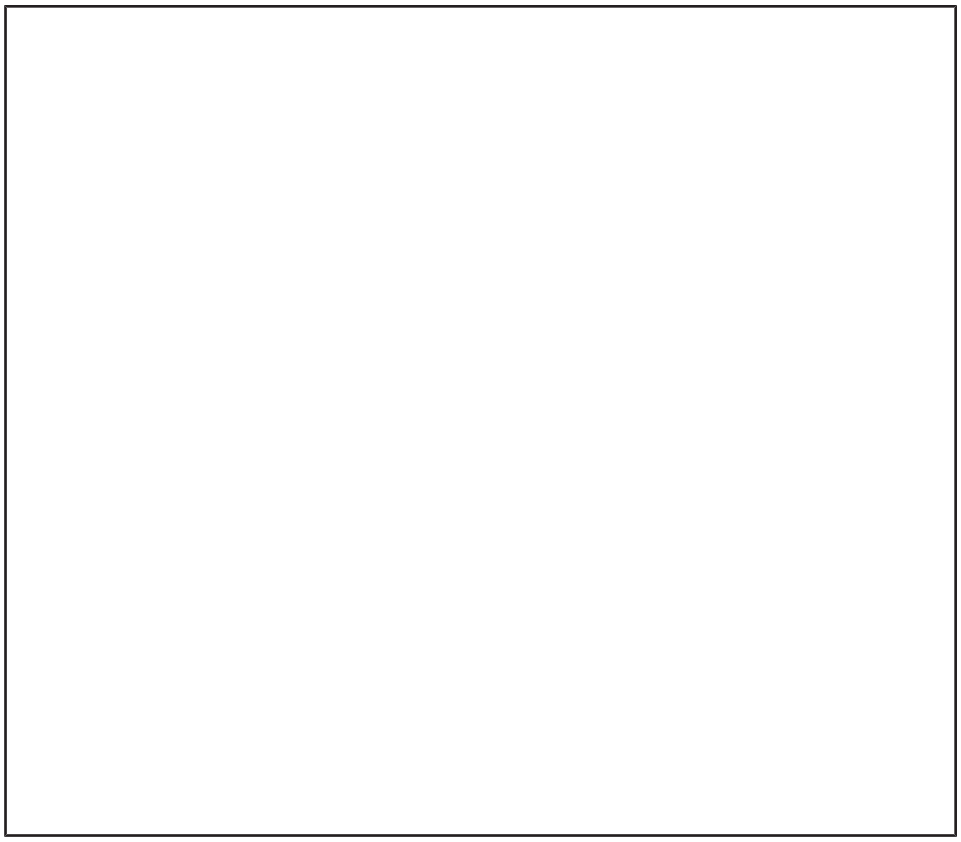
Pump Power Monitoring

Supplementary Operating Manual



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Supplementary Operating Manual Pump Power Monitoring

Original operating manual

Subject to technical modification without prior notice.

Contents

1 Supplementary Operating Manual

1.1 General

This supplementary operating manual accompanies the installation/operating manual. All information contained in the installation/operating manual must be observed.

Table 1: Relevant operating manuals

Type series	Reference number of the operating/installation manual
CPKN	2730.8, 2730.813
CPKN-CHs	2730.84
CPKNO	2730.88
Ecochem-Non-Seal	2940.8
Etanorm-R	1222.8
Etaline-R	1146.82
HPH	1122.8110
HPK	1221.8
HPK-L	1136.8
KWP	2361.8
KWP-Bloc	2362.8
Magnochem	2739.8, 2747.8
Magnochem-Bloc	2749.8, 2747.81
MegaCPK	2731.8
RPH	1316.8014
RPHb	1316.8012, 1316.9013
Secochem-Ex	2939.8
Secochem-Ex K	2939.81

1.2 Other applicable documents

Observe the accompanying product literature provided by the manufacturer of the load monitor.

1.3 Explosion protection

Potentially explosive atmosphere

The motor load monitor is approved for use in potentially explosive atmospheres.

Monitoring of pump fill levels

The dry running monitoring process as carried out by the motor load monitor is not realised in the context of Directive 94/9/EC (ATEX) for safeguarding a proper fill volume of the rotor space, as this would require the use of ATEX-certified monitoring equipment.

1.4 Function

The motor load monitor monitors the motor's active power input. The maximum and/or minimum power input can be adjusted by way of four potentiometers (ones and tens position). If the power rises above or falls below the set values, 2 LEDs will signal overload or low load. The respective output relay switches after an adjustable trip delay.

1.5 Application scenarios

Table 2: Possible application scenarios

Application	Type series	
	Magnochem	Secochem-Ex Ecochem Non Seal
Monitoring of plain bearings	✗	✗
Monitoring of rolling element bearings	✗	-
Monitoring of minimum level	✗	✗
Monitoring of hydraulic overload/cavitation	✗	✗
Air in fluid handled	✗	✗
Coupling out of synchronisation	✗	-

1.6 Technical data

Table 3: Technical data of motor load monitor

Characteristic	Value
Supply voltage	100 to 760 V
Voltage range	0.8 to 1.1 UN
Auxiliary voltage	AC 230 V
Frequency	50/60 Hz
Own consumption	≤ 4 VA
Setting range P1	0 to 7 tens position on relative scale 0 to 9 ones position
Setting range P2	0 to 7 tens position on relative scale 0 to 9 ones position
Measuring accuracy	± 4 % of full-scale value
Trip delay t v1 and t v2	1 to 10 s
Starting override t a	1 to 30 s
Input current range T1/k and L1/i	0.4 to 40 A[1)]
Overload capacity	
Max. continuous current I th	5 A per relay
Switching capacity of contacts to AC 15	3 A/AC 230 V IEC/EN 60947-5
Max. short-circuit protection, fuse	4 A gL to IEC/EN 60947-5-1
Temperature range	-20 to 55 °C
Climatic resistance	30/055/04 to IEC/EN 60068-1
Enclosure	IP40 housing IP20 terminals
Conductor connection	1 x 10 mm² solid or 1 x 6 mm² strand with sleeve
Quick-action fastening	DIN rail to IEC/EN 60715

1) Connect a current transformer in series for a higher nominal motor current.

1.7 Connecting the motor load monitor

1. Connect the power supply (AC 230 V) to terminals A1 and A3 (observe wiring diagrams).
2. Use terminals L/i and T/k as well as L1/i and T1/k to supply the motor current. Note the direction of the current in the process. An error message is output for reverse power (refer to the manufacturer's product literature).

Phase testing

The measuring principle (**P = V × I × cos φ**) of the motor load monitor is only designed for the connection of a clockwise rotary field. If an anti-clockwise rotary field is present, phases L2/L3 must be interchanged at the motor load monitor so that a clockwise rotary field is reconnected to the monitor. If evaluation or analysis is still not possible, interchange the i/k connections.

1.8 Current transformer

If the nominal motor current exceeds 40 A, a current transformer must be connected in series.

Requirements for current transformer:

- Power to be transmitted: 2.5 VA
- Accuracy class: Class 0.5

Current transformers must not be earthed.

The current transformers listed below serve as a reference only.

NOTE

Select the transformer stage in line with the nominal motor current for integration of standardised motors with magnetic coupling and conventional pumps.

Table 4: Current transformer stages for Etaseco (DS)/Secochem-Ex/-K (DE) (for integration of a 5A transformer)

Motor size	Motor code	Voltage [V]			
		50 Hz		60 Hz	
		400	500	480	600
90.2	12M	-	-	-	-
	12	-	-	-	-
	22	-	-	-	-
112.2	42	-	-	-	-
	52	-	-	-	-
132.2	72	-	-	-	-
	112	-	-	-	-
	152	50	-	50	-
160.2	222	75	50	75	50
	302	100	75	100	75
200.2	402	150	100	150	100
	552	150	150	150	150

1.9 Rotate turn dial to home position

1. Rotate turn dial P_1 (tens position) all the way to the left (scale value 0).
2. Rotate turn dial P_1 (ones position) all the way to the left (scale value 0).
3. Rotate turn dial P_2 (tens position) all the way to the right (scale value 7).
4. Rotate turn dial P_2 (ones position) all the way to the right (scale value 10).

1.10 Setting the switching point for minimum power

When the switching point is undershot and the t_v interval defined has elapsed, the motor is switched off.

NOTE

Monitoring the "minimum power" also serves to switch off the pump should it run dry.

CAUTION

Operation at the throttling point for more than 5 minutes

Damage to the pump (set)!

- ▷ Always observe the minimum flow rate of the pump.

1. Switch on the pump and check whether the green LED for V_N lights up (continuously).
2. Adjust the pump's flow rate to the desired minimum flow rate using the discharge-side shut-off element.
   Observe the power input, head and flow rate.
3. Turn or rotate potentiometer P_1 in clockwise direction until the pump unit is switched off by the motor load monitor.
4. Open the discharge-side shut-off element and restart the pump.
5. Throttle the pump until it is switched off to check and verify the P_1 setting.
   ⇨ When the switching point coincides with the target minimum flow rate, the setting for the P_1 turn dial is complete.
6. Using potentiometer t_a[2)], set the starting override to 10 sec. (recommended) to ensure that the increased input power of the motor at start-up is not taken into account.
7. Set potentiometer t_v[2)] to a scale value of 5 sec. (recommended).
8. Restart the pump unit and immediately adjust to match the operating point.

1.11 Setting the switching point for maximum power

Function When the switching point is exceeded and the t_v interval defined has elapsed, the motor is switched off.

1. Adjust the pump's flow rate to the desired maximum flow rate using the discharge-side shut-off element.
   Observe the power input, head and flow rate.
2. Turn or rotate potentiometer t_{v2} all the way to the left (scale value 0.1).
3. Rotate turn dial P_2 slowly in anti-clockwise direction until the pump unit is stopped.
4. Close the discharge-side shut-off element a little and start the pump unit.
   ⇨ When the switching point coincides with the target maximum flow rate, the setting for the P_2 turn dial is complete.
5. Restart the pump unit and immediately adjust to match the operating point.

2) When the pump is started, the ta and tv times set always total. The following calculation results when using the recommended values: ta (10 sec.) + tv (5 sec.) = 15 sec. During this time, the unit does not respond to the stop limits set. Time tv remains active after time ta has elapsed.

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KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com