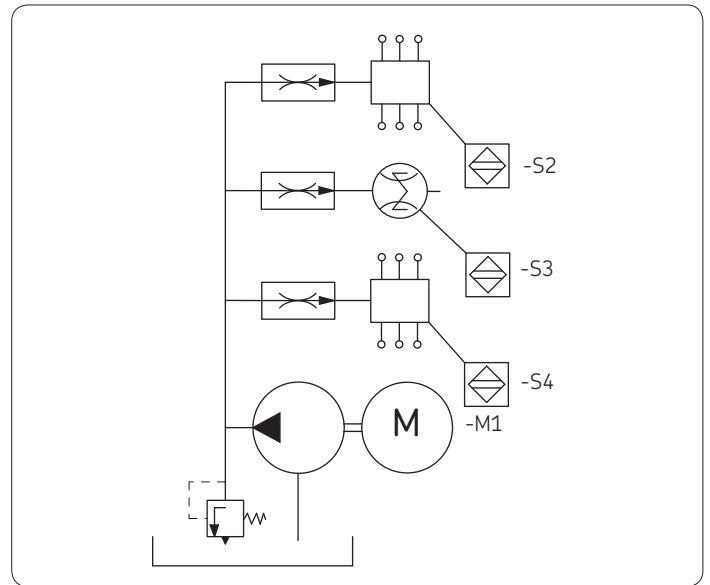


Pulse Monitors



The controllers described in this chapter are used to monitor lubrication with volume-flow controlled pulse transmitters.

This overview shows the available control units for single-line systems together with the scope of their functions.



Function

These controllers monitor up to three signal sources for adherence to preset limit values.

When the limit values are not reached or exceeded, a failure message is output.

Overview of pulse monitors

Designation	Brief description
EWT2A01	Pulse monitor for up to 3 measuring spots
EWT2A01-S1	like the EWT2A01 with lube interval function, NC-contact outputs (fail-safe type)
EWT2A04	Pulse monitor with adjustable monitoring time and selectable monitoring of a high and low limit value or two low limit values
EWT2A04-S1	like the EWT2A04 with lube interval function, NC-contact outputs (fail-safe type)

Our control units conform to generally applicable standards.

Monitoring time

The monitoring time (TU) is the time period during which a defined number of pulses must be received at the sensor contacts of the controller. If this is not the case, the controller outputs a failure message. On some devices, the monitoring time can be set by the user. If that is the case, it is important to ensure that at least two pulses can be received at each input during the monitoring time.

Limit values

The limit value is the number of pulses that must be received at the sensor input (Gbrx) during the monitoring time. On some units, there is a high and low limit value. High limit values must not be exceeded, low limit values must be reached.

Lube interval

With some units, it is possible to initiate a lube interval by applying 24 V voltage to input I4. The lube interval is a period of time in which lubrication is suspended. To keep the control unit from issuing a fault signal due to a lack of incoming pulses, the number of pulses reaching the sensor contacts during this period of time are not counted. The lube interval lasts as long as voltage is applied to input I4.

Installation

The control unit has to be installed in a switchgear cubicle for a centralized lubrication system.

To keep unintended fault signals from being issued by unused inputs, we recommend that the limit value for the unused input be set to the minimum value and shunted to a neighboring input in use.

Operation

Switching on

The device is switched on when the operating voltage is applied. When the operating voltage is present, the green operating voltage LED is on. Power must be switched on or off abruptly.

Monitoring time

Upon power-up, the controller begins to monitor the sensor contacts, the monitoring time is started.

During the monitoring time, the unit counts the number of pulses received at each sensor contact. If the preset limit values are not exceeded, the monitoring time will elapse. Then all counters are reset and a new monitoring time is started.

If a high value has been set for a sensor contact, the monitoring time is terminated as soon as this value is exceeded. A failure message is output and the relay of the sensor contact is closed (cf. relay d1 through d3 during a failure).

If a low limit has been set for a sensor contact, the monitoring time runs until its end. Then, adherence to the limit value is checked immediately, and if it has not been reached, a failure message is output. At the same time, the output relay of the sensor contact is closed (cf. relay d1 through d3 during a failure)

Restart

When the external pushbutton RS is pressed, the monitoring time is terminated and all counters are reset. Then, the monitoring time is restarted. Possible failure message are likewise reset.

A restart is also triggered when the user quits the parameter display after changing parameters.

Switched off

The device is switched off by removing it from the operating power supply.

After switch-off, the device must remain shut off for 30 seconds.

Changing parameters

Change of parameters becomes operative when the user quits the parameter display and the next monitoring time starts.

Failure message

In case of failures, i.e. when a low limit is not reached or a high limit value is exceeded, the output relay assigned to the respective sensor is closed (cf. relay d1 through d3 during a failure).

Insufficient lubrication

The number of registered pulses falls short of the adjusted low limit.

Excessive lubrication

The number of registered pulses exceeds the adjusted high limit.

Relay d1 through d3 during a failure

If a failure occurs, the relay assigned to the respective output has the following condition:

Failure

	Relay (operating contact)		
	d1	d2	d3
EWT2A01	closed	opened	closed
EWT2A01-S1	opened	opened	opened
EWT01A04	closed	opened	–
EWT2A04-S1	opened	opened	–

Deleting a failure message

A failure message can only be deleted by pressing the external pushbutton ReSt.

Delete a failure message only after determining the cause of the failure and resolving it.

EWT2A01, EWT2A01-S1

See important product usage information on the back cover.

Operating Modes

The EWT2A01 and EWT2A01-S1 controllers can only be used in the pulse-monitoring mode.

Scope of functions

EWT2A01

- 3 sensor contact
- adjustable limit values for each input
- monitoring time for the input defined on the basis of set limit values
- 3 failure outputs assigned to the 3 pulse inputs

EWT2A01-S1

like the EWT2A01 but with:

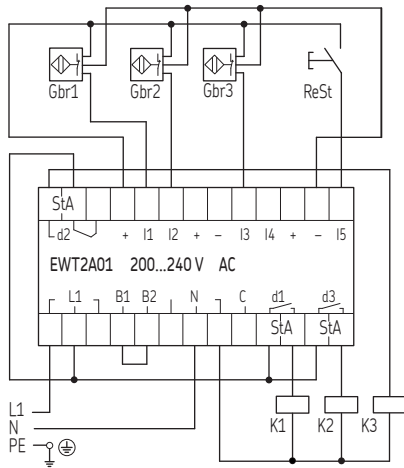
- lube interval function
- NC-contact fault outputs (fail-safe type)

The table shows the preset and adjustable parameters.

Adjustable and preset parameters

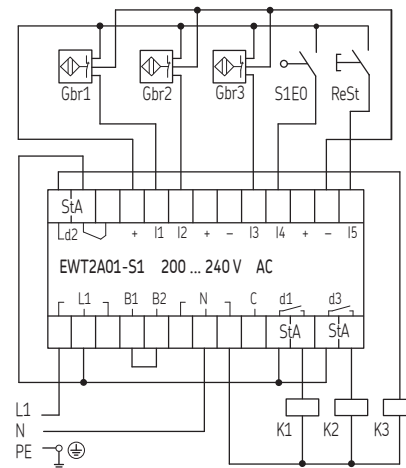
Designation	Abbreviation	Presetting	Units	Setting range	Units
Monitoring time	TU	depends on limit values	seconds	not adjustable	
Limit value 1	I1	10 E 04	0.01 pulses/minutes	01 E 00 - 25 E 04	0.01 pulses/minutes
Limit value 2	I2	10 E 04	0.01 pulses/minutes	01 E 00 - 25 E 04	0.01 pulses/minutes
Limit value 3	I3	10 E 04	0.01 pulses/minutes	01 E 00 - 25 E 04	0.01 pulses/minutes

Wiring diagram EWT2A01



- L1/N = operating voltage
 B1/B2 = jumper terminals for voltage range (illustration: 200...240V)
 Gbr1 = sensor contact 1
 Gbr2 = sensor contact 2
 Gbr3 = sensor contact 3
 S1E0 = lube interval contact
 ReSt = pushbutton
 1. restart
 2. delete failure

Wiring diagram EWT2A01-S1



- + = +24 V DC output
 - = 0 V DC output
 d1 = operating contact for failure display (StA), assigned to Gbr1
 d2 = operating contact for failure display (StA), assigned to Gbr2, change-over contact, resting contact: failure, operating contact: operation OK
 d3 = operating contact for failure display (StA), assigned to Gbr3
 K1 = failure message Gbr1
 K2 = okay message Gbr2
 K3 = failure message Gbr3

EWT2A04, EWT2A04-S1

Operating modes

The EWT2A04 and EWT2A04-S1 controllers can only be used in the pulse-monitoring mode.

Scope of functions

The controllers come with the following functions:

EWT2A04

- 2 sensor contacts
- adjustable limit values for each input
- input of high and low limit values for input I2
- adjustable monitoring time
- 2 failure outputs assigned to the two pulse inputs.

EWT2A04-S1

like the EWT2A04 but with:

- lube interval function
- NC-contact fault outputs (fail-safe type)

The adjustable limit values are low limits, that is, the controller monitors the system for insufficient lubrication.

The EWT2A04 and EWT2A04-S1 controllers can either monitor the two low limit values for two different sensors or a high and low limit for a single sensor. The function is selected by applying or removing power at input I3. When power is applied to input I3, limit value 2 is considered the high limit, that is, input I1 is used to monitor the system for excessive lubrication.

If no power is applied to input I3, limit value 2 is considered to low limit for input I1, that is, the system is monitored for insufficient lubrication.

Installation, first operation

The control unit has to be installed in a switchgear cubicle for a centralized lubrication system.

After installation and after applying the operating voltage, the device begins its function sequence with the monitoring time.

Changing parameters

Setting the monitoring time, input of limit values.

The monitoring time must be selected long enough to allow at least two pulses to be received at each input during the monitoring time. However, we recommend that a much longer monitoring time be set to ensure only substantial deviations are reported as failures, because the occurrence of pulses may be rather irregular.

Calculation example for oil lubrication

(Monitoring of high and low limit value)

A progressive feeder with $n = 8$ distribution outlets and an output volume of $V_{\text{spez}} = 0.13 \text{ cm}^3$ per outlet and cycle is supplied with a volume flow of $Q = 20 \text{ cm}^3/\text{min}$. 2 strokes (2 strokes = 1 pulse) of the feeder pistons are counted as pulses.

The number of pulses then is:

$$I = \frac{Q}{n \cdot V_{\text{spez}}} = \frac{20}{8 \cdot 0.13} = 19 \frac{\text{pulses}}{\text{min}}$$

The controller is supposed to report a failure when the number of piston strokes is exceeded or falls short of the limit value by more than 20%.

$$I_{\text{min}} = I1 = I - (I \cdot 0.2) = 15 \frac{\text{pulses}}{\text{min}}$$

$$I_{\text{max}} = I2 = I + (I \cdot 0.2) = 23 \frac{\text{pulses}}{\text{min}}$$

$$TU_{\text{min}} = \frac{2}{I_{\text{min}}} = \frac{2}{15} = 0.133 \text{ min}$$

Selected monitoring time $TU = 1$ (min)

Setting: $TU = 60 \text{ E } 00$ (seconds)

Parameter I1 = $I_{\text{min}} = 15$ (pulses/min)
Setting: $I1 = 15 \text{ E } 02$ (0.01 pulses/min)

Parameter I2 = $I_{\text{max}} = 23$ (pulses/min)
Setting: $I2 = 23 \text{ E } 02$ (0.01 pulses/min)

Calculation example for grease lubrication

(Monitoring of two low limit values for two different transmitters)

A progressive feeder **A** with $n = 12$ distribution outlets and an output volume of $V_{\text{spez}} = 0.13 \text{ cm}^3$ per outlet and cycle is supplied with a volume flow of $Q = 1 \text{ cm}^3/\text{min}$.

The number of pulses I_A then is:

$$I_A = \frac{Q}{n \cdot V_{\text{spez}}} = \frac{1}{12 \cdot 0.13} = 0.64 \frac{\text{pulses}}{\text{min}}$$

The controller is to report a failure when the number of piston strokes falls short of the limit value by more than 30%.

A second progressive feeder **B** with $n = 6$ distribution outlets and an output volume of $V_{\text{spez}} = 0.13 \text{ cm}^3$ per outlet and cycle is supplied with a volume flow of $Q = 3 \text{ cm}^3/\text{min}$.

Its pulse frequency I_B is 3.85 pulses/min and the actual number may be max. 40% lower.

The two low limit values $I_{A \text{ min}}$ and $I_{B \text{ min}}$ are calculated as follows:

$$I_{A \text{ min}} = I_A - (I_A \cdot 0.30) = 0.45 \frac{\text{Impulse}}{\text{min}}$$

$$I_{B \text{ min}} = I_B - (I_B \cdot 0.40) = 2.31 \frac{\text{Impulse}}{\text{min}}$$

The lower of the two values is used to determine the minimum monitoring time:

$$TU_{\text{min}} = \frac{2}{I_{A \text{ min}}} = \frac{2}{0.45} = 4.4 \text{ min}$$

Selected monitoring time $TU = 60$ min

Setting: $TU = 36 \text{ E } 02$ (seconds)

Parameter I1 = $I_{A \text{ min}} = 0.45$ (pulses/min)
Setting: $I1 = 45 \text{ E } 00$ (0.01 pulses/min)

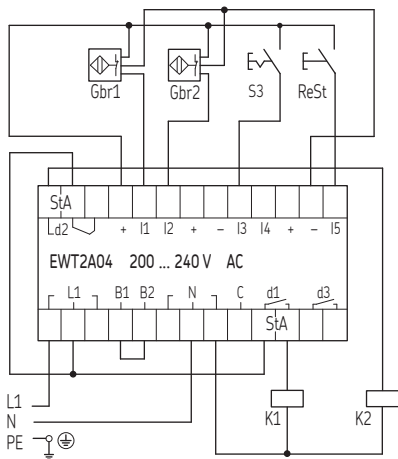
Parameter I2 = $I_{B \text{ min}} = 2,31$ pulses
Setting: $I2 = 23 \text{ E } 01$ (0.01 pulses/min)

EWT2A04, EWT2A04-S1

Adjustable and preset parameters

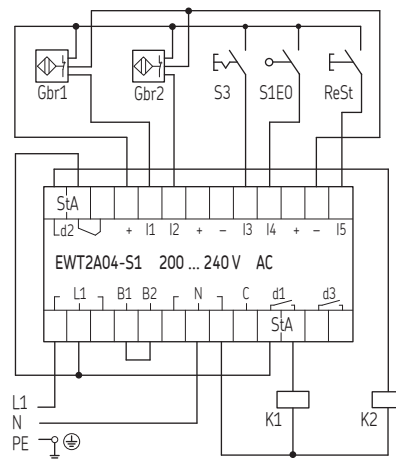
Designation	Abbreviation	Presetting	Units	Setting range	Units
Monitoring time	TU	60	seconds	06 E 00 - 90 E 03	seconds
Limit value 1	I1	10 E 04	0.01 pulses/minutes	01 E 00 - 25 E 04	0.01 pulses/minutes
Limit value 2	I2	10 E 04	0.01 pulses/minutes	01 E 00 - 25 E 04	0.01 pulses/minutes

Wiring diagram EWT2A04

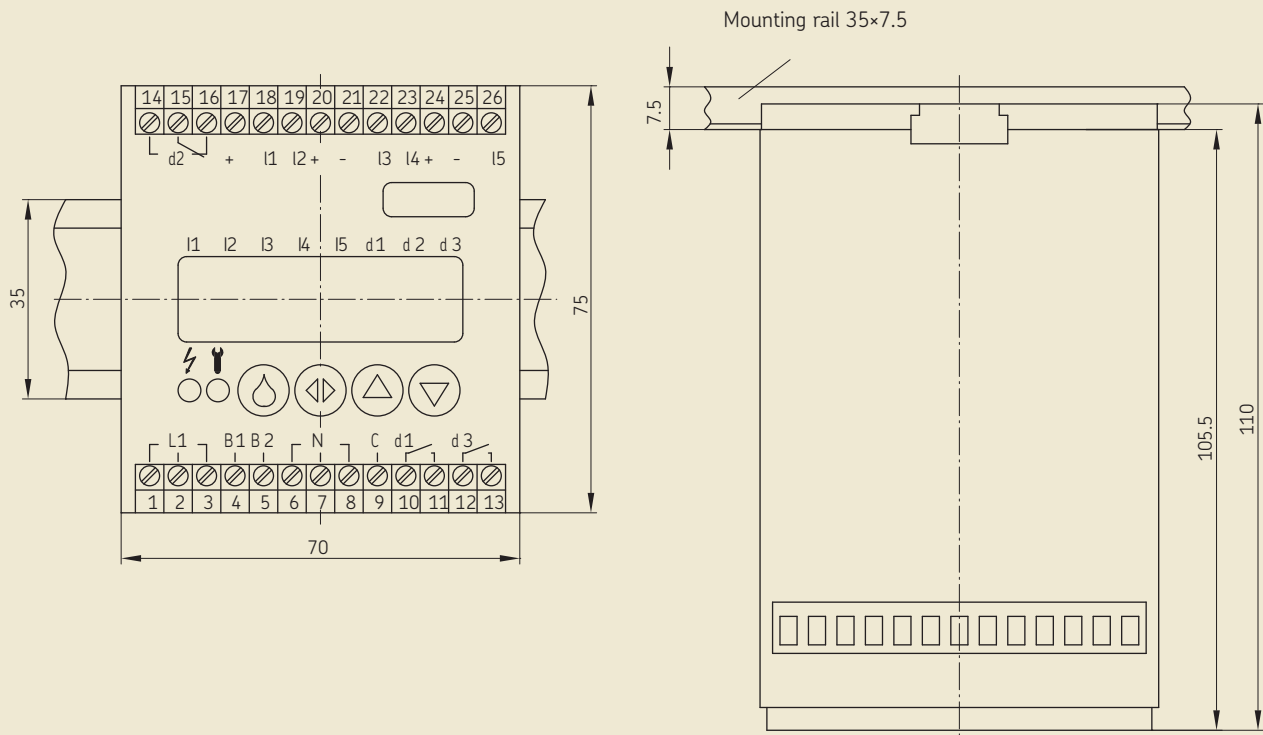


- L1/N = operating voltage
- B1/B2 = jumper terminals for voltage range (illustration: 200...240V)
- Gbr1 = sensor contact 1
- Gbr2 = sensor contact 2
- Gbr3 = sensor contact 3
- S1E0 = lube interval contact
- ReSt = pushbutton
 1. restart
 2. delete failure

Wiring diagram EWT2A04-S1



- + = +24 V DC output
- = 0 V DC output
- d1 = operating contact for failure display (StA), assigned to Gbr1
- d2 = operating contact for failure display (StA), assigned to Gbr2, change-over contact, resting contact: failure, operating contact: operation OK
- d3 = operating contact for failure display (StA), assigned to Gbr3
- K1 = failure message Gbr1
- K2 = okay message Gbr2
- K3 = failure message Gbr3



Technical Data Version +471 / +472

Rated input voltage U_n
 Version +471 100...120 V AC or 200...240 V AC
 Version +472 20...24 V DC or AC

Rated value of input voltage
 Version +471 0.85 U_n to 1.1 U_n
 (85...132 V / 170...264 V)
 Version +472 0.85 U_n to 1.1 U_n (17...26.4)

Rated frequency
 Version +471 50...60 Hz
 Version +472 DC or 50...60 Hz

Rated value of frequency
 Version +471 49...61 Hz
 Version +472 DC or 49...61 Hz

Release value of U_n max. 10 %
 Recovery time 1 s

Residual ripple of input voltage
 Version +471 not applicable
 Version +472 DC: max. 5 %

Max. fusing 6.3 A
 Max. switching current 5 A AC
 Max. relay switching voltage 250 V AC

Overvoltage category to
 DIN VDE 0110 III

Rated voltage of inputs 24 V DC
 Input impedance 2.4 k Ω \pm 10 %
 Input level low 0 V...+4 V
 Input level high +10 V...+26.4 V

Coincidence factor
 for the inputs max. 0.8

Output voltage for inputs
 and external loads 24 V DC +10% / -15%

Rated output current ("+" outputs) 110 mA
 of that figure for external loads max. 60 mA

MK input, max. input frequency 30 Hz
 Pulse duty factor 1:1

Conductor connection (flexible)
 with tubular end sleeves max. 2.5 mm² or 2x 0.75 mm²
 with twin tubular end sleeves max. 2x 1.5 mm²
 stripped length 8 mm

Type of enclosure (version E) IP 30, IP 20 terminals
 Safety class (version E) II
 Rated insulation voltage 250 V AC
 Pollution degree 2
 Operating temperature 0 to +60 °C
 Storage temperature -25 to +70 °C
 Dimensions BxHxT (version E) approx. 70mmx75mmx110mm

Voltage endurance to EN 61131-2 and EN 50178
 Power supply / relay contacts 1780 V
 Power supply / electronics 2830 V
 Relay contacts / electronics 2830 V

EMV
 Immunity EN 61000-6-2
 Emitted interference EN 500081-1

Dynamic strength to EN 60068-2-6 10-57 Hz; 0.075 mm
 (amplitude)
 Impact resistance to EN 600068-2-27 15 g; 11 ms (half-sine)

Order No. 1-1700-5-EN

Subject to change without notice! (07/2014)

Important product usage information

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

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