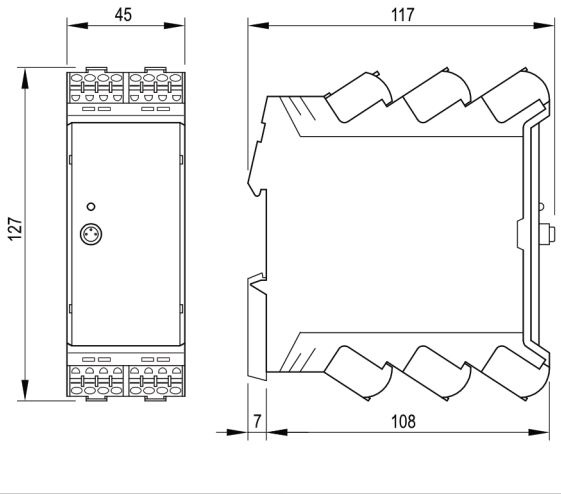
INT69® PYF Diagnose

INT69 PYF Diagnose

Illustration similar. Scope of delivery may deviate.



Dimensions in mm

Application

The INT69 PYF Diagnose with Modbus interface and power measurement is a universal and versatile protection relay.

The following inputs and outputs are available for monitoring electrical components:

Terminals	Inputs and outputs
L/L+, N/L-	Supply voltage
T1, T2	Motor temperature (PTC, Pt100, Pt1000, bimetal, external relay contact)
T3, T4	Temperature 1 (PTC, Pt100, Pt1000)
T5, T6	Temperature 2 (PTC, Pt100, Pt1000)
E+, E-	Leakage (resistance measurement)
SC1, SC2	Switching input (float switch, external reset)
I+, I-	Analog input 0/4-20mA
FE	Functional ground
L1, L2, L3	Phase monitoring with phase sequence, phase failure, phase asymmetry, undervoltage and overvoltage
S1, S2	Current transformer INT185
11, 14, 12	Alarm relay
21, 24, 22	Warning relay
COM, D1, D0, COM	RS485, Modbus RTU

Cosφ, service interval, switching frequency, short circuit and interruption of the sensors can also be monitored.

Consumed apparent, active and reactive power is determined and in the protection relay and active and reactive energy is counted.

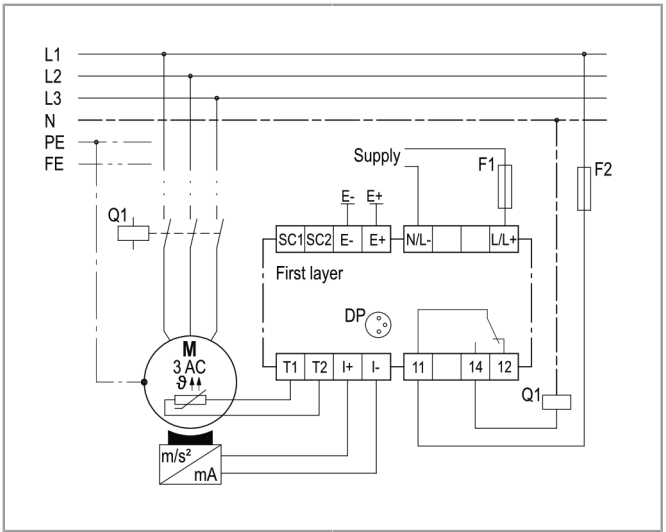
Parametrization enables protection functions and response settings to be adapted flexibly to suit the application.

The INT69 PYF Diagnose saves operating and fault data in a non-volatile memory. This data can be read out and evaluated for diagnostic purposes.

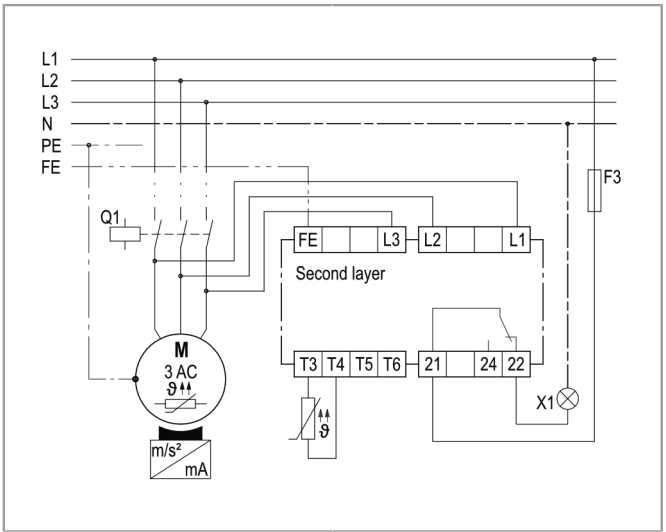
Parameterization and diagnostics are possible via the built-in diagnostic port (DP) using the INTspector app and with separately available accessories.

This protection relay device is used primarily for the protection of pumps and agitators.

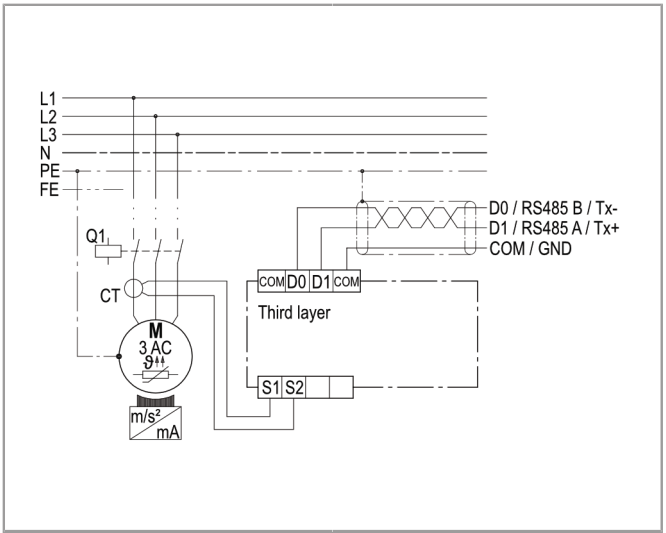
The INT185 current transformer is also required for the full range of functions.



Wiring diagram



Wiring diagram



Wiring diagram

Functional description

All monitoring functions are configurable via simple parameterization using the INTspector app.

The protection relay has **an integrated real-time clock** and records or transmits data with a real time stamp. The real-time clock is not battery-buffered.

The following operating states of the inputs are described as active, but can be deactivated via parameterization.

Temperature monitoring is performed according to the evaluation method of a PTC, Pt100 or Pt1000. The monitoring of a PTC sensor switches off the alarm relay without delay when the nominal response temperature is reached. The monitoring of a Pt100 and Pt1000 switches off the alarm relay or warning relay when the adjustable temperature limits are reached after the adjustable tripping delay has elapsed. A short circuit or an interruption at a temperature input also causes the alarm relay to de-energize (only for PTC, Pt100 and Pt1000, tripping delay for interruption: 30 min., for short circuit: 2 s). The temperature monitoring of the motor winding can additionally be carried out according to the evaluation procedure of a bimetal switch. When the bimetal switch is opened, the alarm relay is switched off without delay. In addition, the NC contact of an external relay can be read in.

Leakage monitoring is based on the evaluation method of an ohmic resistor. The monitoring switches off the alarm relay or warning relay when the adjustable limits are reached after the adjustable tripping delay has elapsed.

Analog signal monitoring is carried out according to the evaluation method of a current. When the adjustable limits are reached, the alarm relay or the warning relay is switched off after the adjustable tripping delay has elapsed. The closed current of the analog signal is adjustable and is additionally monitored.

Phase monitoring of the motor voltage is active from 6 s after motor start. The correct phase sequencing is monitored for 5 s. Phase failure, phase asymmetry, undervoltage and overvoltage during the entire motor running time. If the phase sequence is incorrect, the protection relay locks. The alarm relay or warning relay is also switched off in the event of phase asymmetry, failure, undervoltage or overvoltage after the adjustable limits have been reached and after the adjustable tripping delay has elapsed.
After the motor has stopped, the phase monitoring is deactivated for approx. 2 s to prevent unintentional locking due to brief reverse running of the machine. To guarantee the function of the INT69 PYF Diagnose the functional ground must be connected.
In frequency converter operation, the phase failure and phase asymmetry monitoring are combined for frequency converter monitoring.

Current monitoring is implemented using a connected current transformer that monitors the current of phase L1 for overcurrent or undercurrent. When the adjustable limits are reached, the monitoring function switches off the alarm relay or warning relay after the adjustable tripping delay has elapsed. An adjustable start-up bridging time that delays the monitoring function after the run detection has elapsed is used to avoid false shutdowns.

The **power measurement** works automatically with connected phases and current transformers and displays converted active, reactive and apparent power. An **integrated energy meter** determines active and reactive energy.

If a current transformer is connected, **cosφ monitoring** is also possible. The monitoring can be set to “Exceeding” or “Falling short” and switches off the alarm relay or warning relay when the adjustable limits are reached after the adjustable tripping delay has elapsed. An

adjustable start-up bridging time that delays the monitoring function after the run detection has elapsed is used to avoid false shutdowns.

The **switching frequency monitoring** records switching operations per time period. When the adjustable switching is exceeded within the settable time period, the alarm relay or the warning relay is switched off.

The INT69 PYF Diagnose has a service interval function. Restarting the **service interval** loads the adjustable interval time. After the time has expired, the service is indicated by the built-in LED or additionally by switching off the warning relay (parameterisable).

Adjustable parameters (see parameter table) can be set via the diagnostic port using INTspector app with separately available accessories. The **LED** indicates the current status of the protective relay (see flashing code). In fault-free operation, the installed LED shows a steady green light. The **alarm relay** and **warning relay** are energized. If a fault or warning is detected, the alarm or warning relay drops out. The warning relay can be activated or deactivated per input via the parameterisation. Both relays operate according to the closed-circuit current principle.

A short circuit or an interruption at a sensor input will cause the alarm relay to switch off.

Reconnection after a lockout is only possible after a **reset**.

All detected events such as warnings, errors or messages are stored in a non-volatile internal memory and can be read out via the diagnostic port and the INTspector app. The event memory contains the 100 most recent events with time and date; the 10 most recent errors are also recorded with extended data for all sensor inputs.

The **Modbus** interface supports the following standard Modbus function codes:

- 0x03 read holding registers
- 0x04 read input register
- 0x2B / 0x0E read device identification

For proper operation, the functional ground (FG) must be connected and the supply voltage must be permanently present.

Safety notices

⚠ Installation, maintenance and operation must be carried out by a qualified electrician.

The applicable European and country-specific standards for the connection of electrical equipment must be observed.

Outgoing connected sensors and connecting cables from the terminal box must have at least basic insulation.

Fittings

INTspector app

The INTspector app is required for parameterisation and diagnostics with the protective relay.

INT600 DU gateway 02 S 365 S21

USB gateway, direct connection between INT69 PYF Diagnose and the PC, smartphone or tablet

INT185 current transformer 02 D 187

Required for measuring current, determining power and cosφ, as well as for the energy meters.

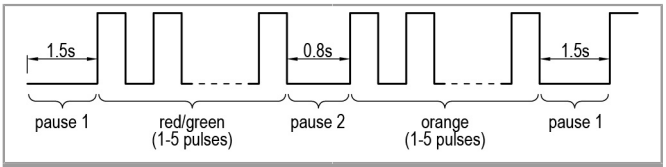
Ordering information

INT69 PYF Diagnose	**20A721P081** (AC/DC 50/60Hz 24V) **22A721P081** (AC 50/60Hz 100-240V)
Further product information	See www.kriwan.com

Flashing code

The KRIWAN flashing code is used for quick and easy status indication and troubleshooting.

The flashing code consists of a cyclic flashing sequence. In the event of a fault, the flashing sequence consists of red and orange pulses. If warnings are pending, the sequence consists of green and orange pulses. The current status can be determined from the number of flashing pulses.



Flashing code

Overview of flashing code

Steady green	Machine ready for operation
Flashing green	Machine in operation
Steady orange	Machine ready for operation, service due
Orange flashing	Machine in operation, service due
Green / orange flashing	Warning, see the description below
Red / orange flashing	Fault, motor is shut down, see the description below

1. Flashing sequence (LED red: error, LED green: warning)	2. Flashing sequence (LED orange)	Description
1	1	Motor temperature: switch-off, permissible winding temperature exceeded
1	4	Motor temperature: sensor input detected an open or short circuit
2	1	Phase monitoring: incorrect phase sequence
2	2	Phase monitoring: mains operation: phase failure/asymmetry FC operation: FC fault
2	3	Phase monitoring: undervoltage/overvoltage
2	4	Phase monitoring: switch-back delay in progress
3	1	Temperature input 1: switch-off/warning, permissible temperature exceeded
3	2	Temperature input 2: switch-off/warning, permissible temperature exceeded
3	4	Temperature input 1: sensor input detected an open or short circuit
3	5	Temperature input 2: sensor input detected an open or short circuit
4	1	Leakage 1: switch-off/warning, permissible limit exceeded/undershot
4	3	Switching input 1: switch-off
5	1	General: internal error
5	3	General: analog input 1 switch-off/warning, permissible limit exceeded/ undershot
5	4	General: analog input 1 sensor fault detected, closed current undershot
5	5	General: switching frequency switch-off/, permissible switches exceeded
6	1	Current transformer input 1: switch-off/warning permissible limit exceeded/undershot
6	2	Current transformer input 1: sensor fault detected
6	3	Cosφ monitoring: switch-off/warning permissible value exceeded/undershot

Technical data

Supply voltage	
22 A 721 P081	AC 50/60 Hz 100-240 V ±10% 9 VA
20 A 721 P081	AC/DC 50/60 Hz 24 V ±20% 7 VA
Permissible ambient temperature T_A	-30… +70 °C
Permissible humidity	0...95% r.h., non-condensing
Maximum usage height	2000 m
Temperature measuring circuit bimetal/external relay contact	
– Type	for an NC contact
– Contact suitable for	24 V DC, 20 mA
– Max. line length	100 m
PTC temperature measuring circuit	
– Type	1-9 PTC sensors according to DIN 44081, DIN 44082 in series
– $R_{25, total}$	<1.8 kΩ
– $R_{Triggering, static}$	4.5 kΩ ±20%
– R_{Reset}	2.75 kΩ ±20%
– Short circuit monitoring	<20 Ω
– Break monitoring	>20 kΩ
– Max. line length	100 m
Pt100 temperature measuring circuit	
– Measuring range	- 50… +300 °C
– Resolution	1 K
– Accuracy	5% of the ohmic value
– Short circuit monitoring	<20 Ω
– Break monitoring	>400 Ω
– Max. line length	100 m
Pt1000 temperature measuring circuit	
– Measuring range	- 50… +300 °C
– Resolution	1 K
– Accuracy	5% of the ohmic value
– Short circuit monitoring	<20 Ω
– Break monitoring	>2.3 kΩ
– Max. line length	100 m
Leakage measuring circuit	
– Type	Resistance measurement between electrode pairs
– Measuring range	10 k to 1 MΩ
– Resolution	1 kΩ
– Accuracy	±(1 kΩ + 10% of the MV)
– Max. line length	100 m
Switching input	
– Type	For a floating NC or NO contact (e.g., reset button)
– Contact suitable for	24 V DC, 20 mA
– Max. line length	100 m

Analog input	
– Type	0…20 mA / 4…20 mA current signal
– Applied voltage	24 V DC +5% / -25%
– Measuring range	0…20 mA
– Resolution	0.1 mA
– Accuracy	± 2.5% of the MV
– Current limitation	30 mA, short-circuit-proof
– Max. line length	30 m
Phase measurement	
– Operation with FC	Suitable
– Measuring range, phase-phase	AC 20…100 Hz, 100…690 VAC ±10%
– Resolution	1 V
– Clock frequency range	2…16 kHz
– Typical clock frequency	8 kHz
– Precision, sinus operation	±(1 V + 2.5% of the MV)
– Precision, FC operation	±(1 V + 5% of the MV)
– Max. line length	3 m
Frequency measurement	
– Resolution	1 Hz
– Accuracy	±1 Hz
Current measurement	
– Type	For a current transformer
– Load	R=75 Ω, I_{max} =40 mA
– Measuring range with 02D187	1~ AC 20…100 Hz ±10%
– For 1 winding	5...100 A
– For 10 windings	0,5...10 A
– Resolution	0.01 A
– Accuracy	
– Sinus operation	± 2.5% of the MV
– FC operation	± 5% of the MV
– Max. line length	3 m
Cosφ measurement	
– Measuring range	0…1
– Resolution	0.01
Power measurement with 02 D 187	
– Measuring range	AC 20…100 Hz ±10%, 120 kVA
– Resolution	1 VA/W/var
– Precision (FC operation)	
– Active power, reactive power	±10% at cosφ > 0.4
– Apparent power	±10%
Energy meter	
– Measuring range	Approx. 43 GWh/Gvarh
– Resolution	0.01 kWh/kvarh

Modbus	
– Protocol	Modbus RTU (TwoWire)
– Address range	1…247
– Suitable cable	Twisted pair, e.g., cable LiYCY (TP) 2x2x0.25 mm²
– Security	Electrically isolated
– Specification	Modbus application protocol specification of Modbus-IDA
– Interface	RS485
– Baud rate	9,6 k, 19,2 k, 38,4 k or 57,6 k
– Parity	Even, odd or none
– Stop bit	1 or 2
– Terminal resistance	No internal terminal resistance. 150 ohm required between D0-D1, see scope of supply
Interface	Diagnostic port (DP)
Reset of lock or restart delay	
– Option 1	Network reset >5 s
– Option 2	External reset at switching input Only possible once any errors have been rectified
Alarm/warning relay	
– Contact	240 V AC, 2,5 24 V AC/DC, 20 mA
– Mechanical service life	Approx. 1 million cycles
Degree of protection as per EN 60529	IP20
Connection type	
– General	Tension spring connection (push-in) 0.2-2.5 mm²
– Modbus	Screw terminal 0.2-2.5 mm²
Housing material	PA 66 GF 30
Fixing	Control cabinet housing (basic grid 45 mm), clippable on to 35 mm standard rail as per EN 60715
Dimensions	See dimensions in mm
Weight	
– 22 A 721 P081	315 g
– 20 A 721 P081	310 g
Test regulations	EN 61000-6-2 EN 61000-6-3 EN 61010-1 Overvoltage category III Degree of pollution 2
Approval	UL File No. E473026 cURus

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