

Mini Switch

Optoelectronic liquid Level limit switch
Threaded connection
integrated switched light circuit module
Output open-collector pnp transistor

Product group **720**

Type **0020/21/23**

Page: 1/1

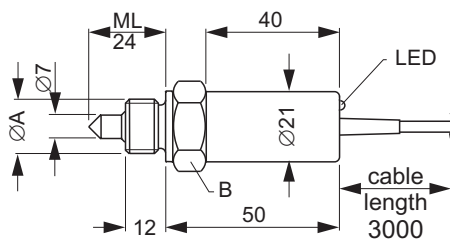
Revision: 7

Date:

7/08



Version
M16x1,5



This type can be delivered
in three versions:

Typ	ØA	B
720.0020SX	M16 x 1,5	SW24
720.0021SX	NPT 1/2"	SW24
720.0023SX	G1/2A	SW30

Cross reference:

New ordering no	Old ordering no
7200020SE	178 558
7200020SA	178 559
7200021SE	178 556
7200021SA	178 557
7200023SE	178 562
7200023SA	178 561

measures in mm

Field of application

This Optoelectronic limit switch is for signalling liquid level limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties like density, dielectric constant, conductivity or color. The very compact construction only needs a minimum of space and enables it also to measure very small volume levels. With its built in green LED the activated state is indicated. It can also be used in transparent tanks.

General Data

Measuring accuracy: +/-0,5 mm
Light source: IR-Light 930 nm
Ambient light: max. 10.000 Lux
Minimum distance
Sensor tip to any opposite wall: >10 mm
Mounting direction: any
Indication of active output: green LED
Switch direction: to be set at factory

Design Data

Operating temperature: -30 to +140 °C
Ambient temperature: -25 to +70 °C
Operating pressure: 0 - 5 MPa (0 - 50 bar)
Material Sensor-housing: SS
Material Light guide: Quartzglass
Material packing: PTFE
Material housing: SS
Weight: 0.15 kg

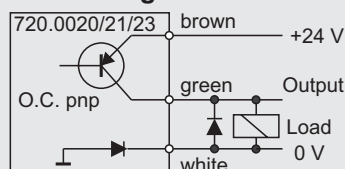
Electrical Data

Rated voltage: 24 V DC -25/+30 %
Supply current max.: 40 mA
Output: O.C. pnp-Transistor
current, voltage dissipation limited
short-circuit-protected

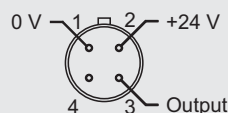
Switch current (Tu=70 °C): 0,5 A
Connection: PVC-cable 3*0.14 mm2
or plug 4-pole serie 713, M12
Ingress protection EN 60529 with plug: IP 65
With cable: IP 66

subject to alterations

Connection diagram



pin assignment



Ordering no.

7 2 0 0 0 2 X S X - 5 9 _ _ _ X X X

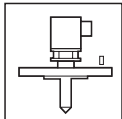
Connection	M16x1,5	0
	NPT 1/2"	1
	G1/2A	3
Switch direction	switching immersed	E
	switching dry	A

B	Plug M12	Cable or plug type
P	PVC cable	
3	3 m	Cable length
5	5 m	
A	Cable shielded	electrical connection
K	Cable	
S	Plug	

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Compact Limit Switch

Optoelectronic liquid Level limit switch with integrated alternating light circuit module and relay. The switching function can be set with a switch as well as sensitivity for any application.

Product group **720**

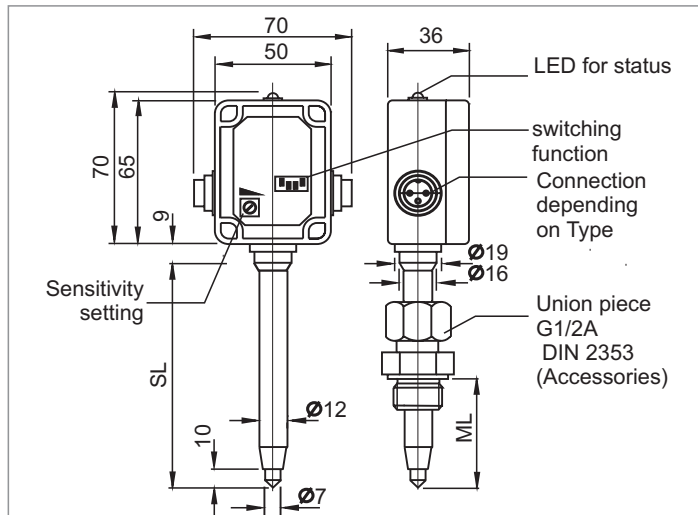
Type **0030/33**

Page: 1/1

Revision: 4

Date:

4/06



Field of application

This Optoelectronic limit switch is for signalling liquid level limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties like density, dielectric constant, conductivity or color. Even foam is no problem as sensitivity can be set. The very compact construction only needs a minimum of space for mounting and allows measuring lengths up to 2000 mm. It can also be used in transparent tanks. With its built in green LED the activated state of the relay is always indicated.

General Data

Measuring accuracy: ±0,5 mm
 Light source: IR-Light 930 nm
 Ambient light: max. 10.000 Lux
 minimum distance sensor tip to any opposite wall: >10 mm
 Fitting position: any
 Indication of active state relay: green LED
 Switch logic: reversible
 Weight: ML 18-49: 0.12 kg + 5 g/cm ML

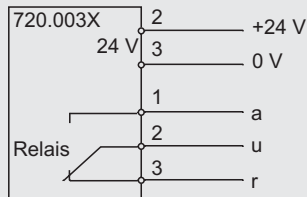
Sensor length SL	Measuring length ML
100	18 - 49
250	18 - 200
550	18 - 500
1050	18 - 1000
2050	18 - 2000



Design Data

Operating temperature: -30 to +95 °C
 Ambient temperature: -25 to +60 °C
 Operating pressure: 0 - 5 MPa (0 - 50 bar)
 Material Sensor-housing: 1.4571
 Material Light guider: Quartzglass
 Material packing: PTFE
 Material housing: Makrolon

Connection Diagram



Pin assignment



Electrical Data

Rated voltage: 24 V DC -25/+30 %
 Supply current max.: 40 mA
 Switch voltage/current: 250 V AC / 3 A
 Stress cycles: > 10⁷
 Connection Relay-output: Plug 3-pole serie 723
 Connection power supply: Plug 4-pole serie 723
 Ingress protection EN 60529 completed: IP 65

subject to alterations

Ordering No.

7 2 0 . 1 1 0 3 1 7 X X X . 0 0 3 X - X

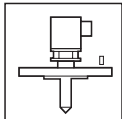
Sensor length	Sensor length in cm, e. g. 250 mm = 025	X X X
Output	Plug, standard-Relay	0
	Plug, fast-cycle-relay	3

N	Normal	Construct.
D	Differential, sensor displaced from electronic	

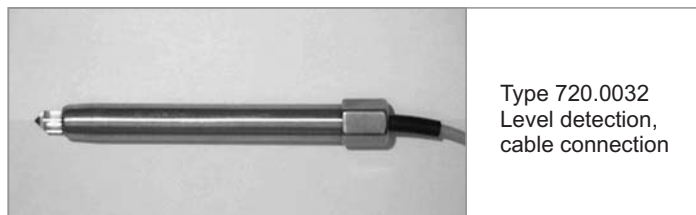
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Transducer	Product group 720	
	Type 0032	
	Sheet: 1/1	Revision: 4
	Date: 7/08	
Optoelectronic liquid level limit sensor one-piece design		



Type 720.0032
Level detection,
cable connection

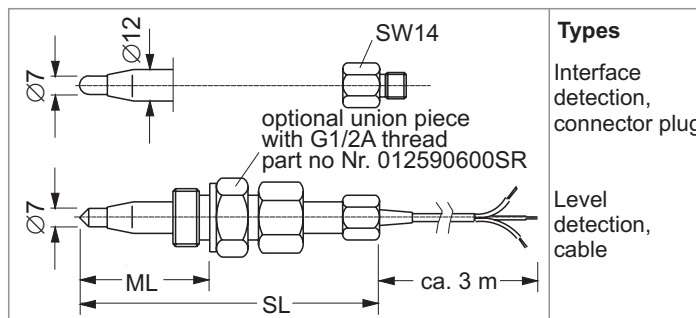
Field of application

This Optoelectronic limit sensor is for signalling liquid level and interface limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties like density, dielectric constant, conductivity or color. The very compact construction only needs a minimum of space and enables it to measure in very small volumes. It also can be built into pH-electrode connections

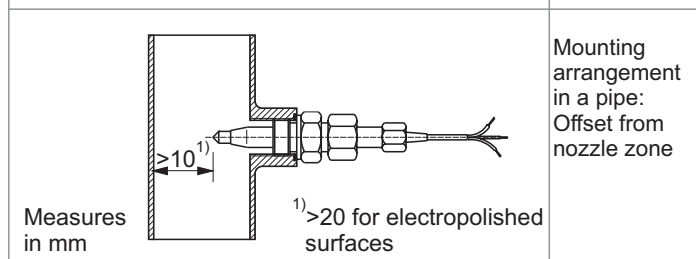
SL	ML	Stock no.	
		Level	Interface
100	18 - 49	7200032L010	7200032I010
150	18 - 100	7200032L015	7200032I015
250	18 - 200	7200032L025	7200032I025
550	18 - 500	7200032L055	7200032I055
1050	18-1000	7200032L105	7200032I105

General Data

Accuracy: ±0,5 mm
 Minimum difference in refractive index for interface detection: 0,01 R.I.
 Light source: IR-light 930 nm
 minimum distance between Sensor tip and any opposite surface: >10 mm
 Installation orientation: any
 Controller: Type 720.0250



Types
 Interface detection, connector plug
 Level detection, cable



Mounting arrangement in a pipe:
 Offset from nozzle zone

Measures in mm

¹⁾>20 for electropolished surfaces

Design Data

Operating temperature: - 30 to +95 °C
 Ambient temperature: -25 to +95 °C
 Operating pressure: 0 - 5 MPa (0 - 50 bar)
 Material Sensor-housing: 1.4571
 Material light guide: Quartz glass
 Material packing: Graphite
 Weight: 0,1 kg
 +5 g/cm elongation

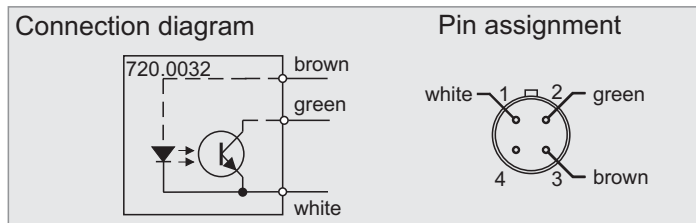
Electrical Data

Supply, output: see Controller Type 720.2501.XY
 Connection: PVC-cable 3*0,14 mm2 or plug 4-pole serie 713
 Ingress protection EN 60529 with plug: IP 65
 with cable: IP 67

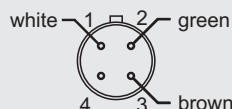
Accessories

Union piece DIN 2353 G1/2A 012590600SR
 Female plug for connector plug STK4713M12

Subject to alterations



Pin assignment

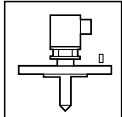


Ordering no.

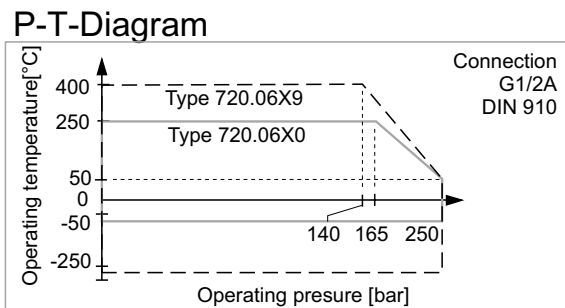
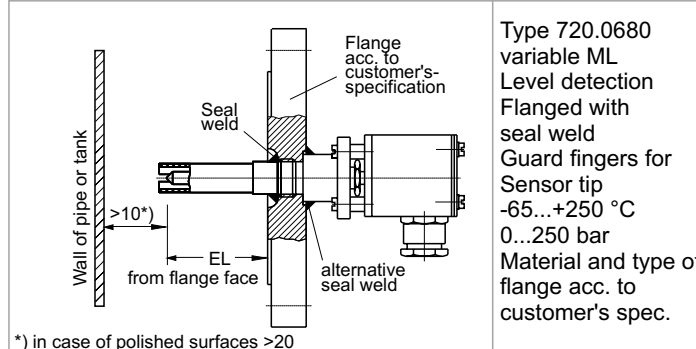
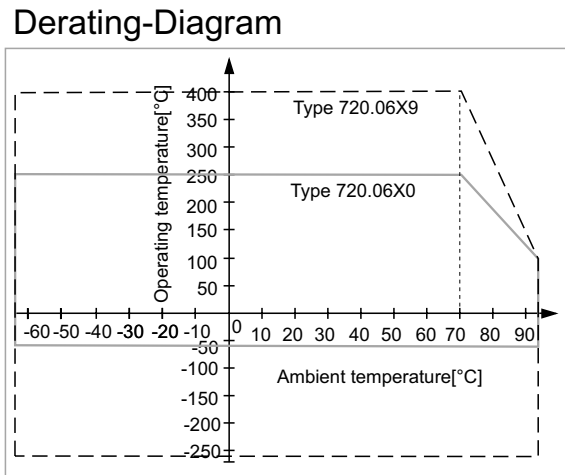
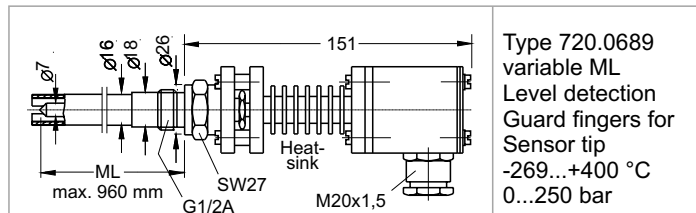
7 2 0 . 0 0 3 2 X X X X - X

Measure	Interface	I	L	Sensor length SL [cm]	
				0	5
	Level	0	1	0	100 mm
	Level	0	1	5	150 mm
	Level	0	2	5	250 mm
	Level	0	5	5	550 mm
	Level	1	0	5	1050 mm

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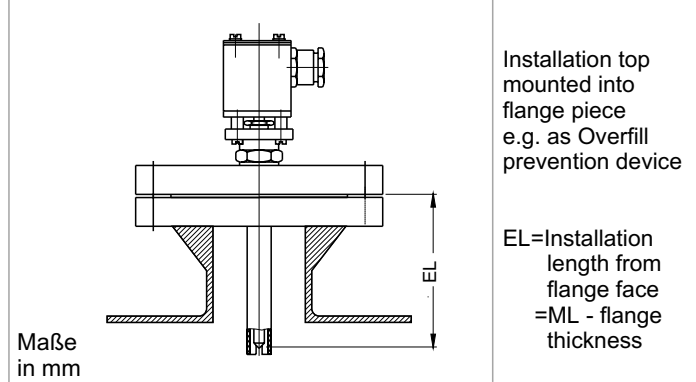


Transducer	Product group 720	
	Type 06XX	
Application hints	Sheet: 2/2	Revision: 3
	Date: 7/03	



Flanges

DIN: from DN25 PN6, DL A/B/C/D/E, F/FA/N/NA
V13/R13/V14/R14, M/L
ANSI: from 1" ANSI 150, FF/RF/RJ(RTJ), LT/LG/ST/SG
LM/LF/SM/SF
Material: 1.4571, Hastelloy, Inconel
Incoloy, Monel, Titanium, Tantalum
Installation: Transducer screwed into flange or
seal welded with flange



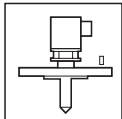
Joint rings

D21 x 26 DIN 7603 for connection G1/2A
-10 to 400 °C: 1.1003 (soft iron)
-196 to 30 °C: 2.0090 (copper)

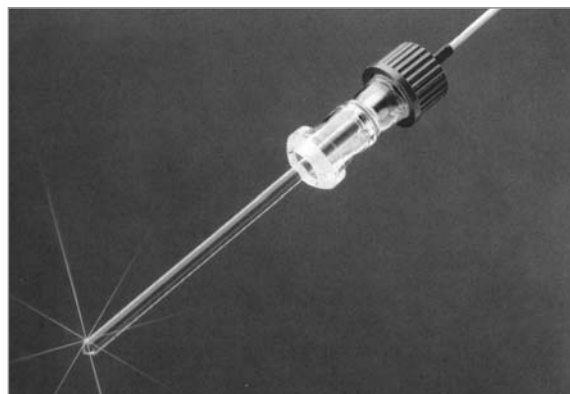
Subject to alterations

Ordering no. for Accessories		Flanges, material 1.4571, in parts	
DN25 PN40 RF	5751432859B	DN50 PN40 tongue	5751632459B
DN25 PN40 groove	5751431759B	DN16 PN325 L	5751331659B
DN25 PN40 tongue	5751432959B	DN24 PN325 L	5751335559B
DN40 PN40 RF	5751631459B	Seal weld	193798
DN40 PN40 groove	5751431959B	Sensor protection	
DN40 PN40 tongue	5751631859B	sieve, material 1.4571	59390001
DN50 PN40 RF	5751631159B	Joint rings	
DN50 PN40 groove	5751631759B	Mat. 1.1003 D21x26 DIN 7603, sph.	D07603921026
		Mat. 2.0090 D21x26 DIN 7603 Cu	D07603C26021

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Laboratory Transducer	Product group 720	
	Type 0042	
Optoelectronic liquid Level limit sensor completely made of glass	Page: 1/1	Revision: 5
	Date: 7/08	



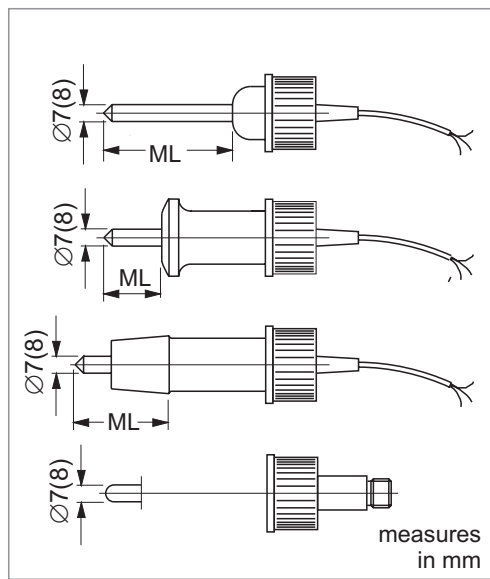
Version:
spherical
flange KF,
Level
sensor,
cable
connection

Field of application

This Optoelectronic limit sensor is for signalling liquid level and interface limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties such as density, dielectric constant, conductivity or colour. The very compact construction only needs a minimum of space and also enables it to measure very small volume levels.

General Data

Measuring accuracy:	±0,5 mm
Difference of Refractive Index for interface measurement min.:	0,01 R.I.
Light source:	IR-light 930 nm
Minimum distance Sensor tip to any opposite wall:	>10 mm
Measuring length ML maxl for Duran:	250 mm
for Quartz:	500 mm
Mounting direction:	any
Controller necessary:	Switch amplifier type 720.0250
Weight:	0.1 kg +1.3 g/cm ML



Design

- Stopper rod,
Level sensor,
Cable connection
- Connection spherical
flange from
KF15,
Level sensor,
Cable connection
- Connection
Conic plug from
NS19/26,
Level sensor,
Cable connection
- Interface sensor
Plug connector

measures
in mm

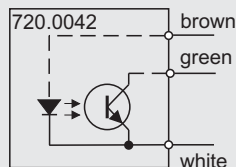
Design Data

Operating temperature:	- 60 to +250 °C
Ambient temperature:	-25 to +95 °C
Operating pressure:	0 - 0,5 MPa (0 - 5 bar)
Material Sensor-housing and sensor:	Quartz/Duran
Material light guide:	Quartz/Duran
Material screw-cap:	Plastics

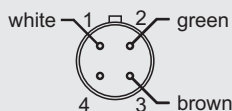
Electrical Data

Power supply:	see controller Type 720.2501.XY
Connection:	PVC-cable 3*0,14 mm2 or 4 pole plug serie 713
Ingress protection acc. to EN 60529 with plug: with cable:	IP 65 IP 67

Connection diagram



pin assignment



subject to alterations

Order No.

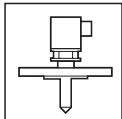
7 2 0 . 0 0 4 2 X V A R - X X X X

Measure	Interface	I					
	Level	L					
Glass material	Duran		D				
	Quartz		Q				
electr. connection	Cable			K	X		
	Plug			S			
							e. g. 1=1 m
							Cable length in m

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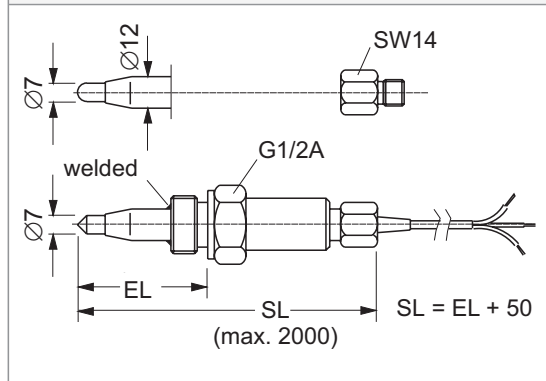




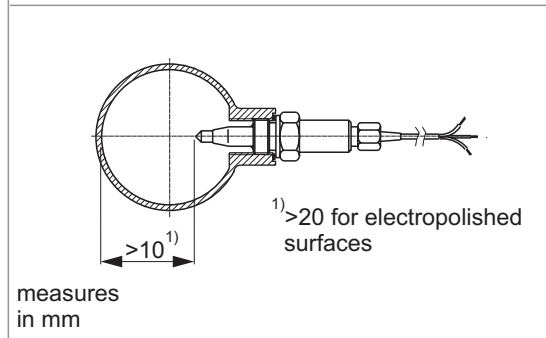
Transducer	Product group 720	
	Type 0632	
	Sheet: 1/1	Revision: 4
	Date: 7/08	



Example
Level detection and plug connection



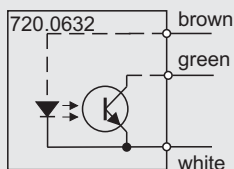
Types
Level or interface detection, plug or cable connection



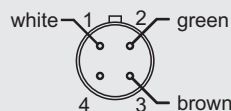
Mounting arrangement in a pipe: offset from nozzle zone

measures in mm

Connection diagram



Pin assignment



Field of application

This Optoelectronic limit sensor is for signalling liquid level and interface limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties like density, dielectric constant, conductivity or color. The very compact construction only needs a minimum of space and enables it to measure in very small volumes. It also can be built into pH-electrode connections

General Data

Accuracy:	±0,5 mm
Minimum difference in refractive index for interface detection:	0,01 R.I.
Light source:	infrared-light 930 nm
Sensor length:	100...2000 mm
minimum distance between sensor tip and any opposite surface:	>10 mm
- in case of electropolished surface:	>20 mm
Orientation:	any
Connection:	G1/2A
Controller:	amplifier type 720.2501.XY

Design Data

Operating and ambient temperature:	-20 ... +60 °C
Operating pressure:	0 - 3 MPa (0 ... 30 bar)
Material Sensor-housing:	1.4571
Material light guide:	quartz glass
Material packing:	graphite
Weight:	0,1 kg
	+5 g/cm elongation

Electrical Data

Supply, output:	see controller type 720.2501.XY
Connection:	PVC-cabel 3*0,14 mm ² or plug 4-pole series 713

Ingress protection EN 60529 with plug: IP 65
- with cable: IP 67

Accessories

Female plug for connector plug STK4713M12

Certificates

National technical approval WHG§19 (only for Germany) Z-65.14-1

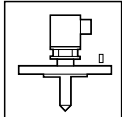
Subject to alterations

Ordering no.

7	2	0	.	0	6	3	2	X	X	X	X	-	X							
													K	Kabel	electrical connection					
													S	Stecker						
													0	1		0	100 mm	sensor length SL [cm]		
													0	1		5	150 mm			
													0	2		5	250 mm			
													0	5	5	550 mm				
													1	0	5	1050 mm				
measure	interface	I	L	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	level																			

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Transducer

Optoelectronic liquid Level limit transducer
All wetted parts from glass and hermetically sealed
Special connections for glass apparatus

Product group **720**

Type **0642**

Sheet: 1/1 Revision: 2

Date: 7/03



Con-
nection
type
büchiflex
sphere
DN 25
Level

Field of application

This Optoelectronic limit sensor is for signalling liquid level and interface limits. A big advantage is that to a great extent the optoelectronic sensor works independently of physical properties such as density, dielectric constant, conductivity or colour. The very compact construction only needs a minimum of space and also enables it to measure very small volume levels. It can be used for Ex Zone 0 and Zone 1.

General Data

Accuracy: ±0,5 mm
Reproducibility: ±0,1 mm
Difference of Refractive Index for interface measurement min.: 0,02 R.I.
Light source: IR-Light 930 nm
Ambient light: max. 100 Lux
ML max: Borsilikat glass: 250 mm
Quartz: 500 mm
any

Mounting direction:

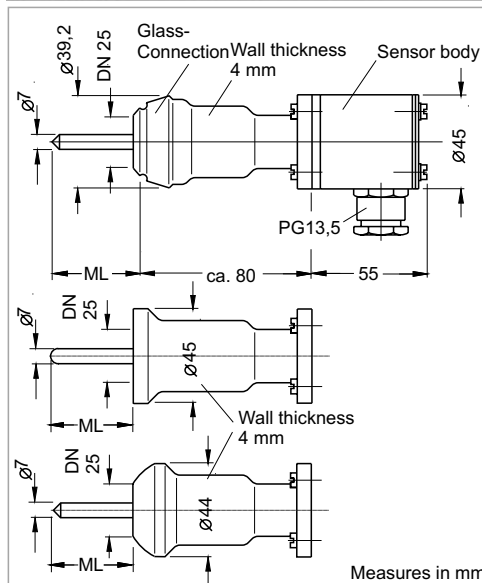
Minimum distance Sensor tip to any surface: > 10 mm
Connection: Büchi sphere, KF sphere, DN 25
Weight: ca. 0,4 kg + 1,3 g/cm ML

Design Data

Operating temperature: -50 to +200 °C (with PTFE-sealing)
-50 to +95 °C
Ambient temperature: -50 to +95 °C
Operating pressure: 0 -1 MPa (0 - 10 bar)
Material Sensor/housing: Borosilikat glass 3.3, Quartz
Material light guide: Borosilikat glass 3.3, Quartz
Material sensor body: Stainless steel
Ex protection: II 1/2 G EEx ib IIC T5, T6
T6: to 60 °C, T5: to 75 °C

Electrical Data

Cable gland: M20x1,5, for Ex blue
Screw terminals: 3 * 2,5 mm²
Ingress protection EN 60529: IP 65



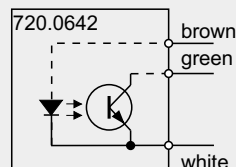
Connection type
büchiflex sphere
DN 25
Level

Connection type
büchiflex flat
ground seal DN 25
Interface

Connection type
sphere KF 25
DN 25
Level

Measures in mm

Connection Diagram



Certificates

EC-Type Examination Certificate: ZELM 02 ATEX 0087
Zone 0 + 1, ASEV is included in ATEX
Subject to alterations!

Ordering no.

7 2 0 . X 1 X 3 0 0 X X X . 0 6 4 2 X ? ? ? ? ? ? ?

1=Standard
2=Ex

1=Level
2=Interface

ML XXX in cm
e.g.:
150 mm=015

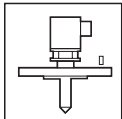
B=büchiflex sphere
P=büchiglass
flat ground seal
K=KF sphere

?=Code not in use

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PHÖNiX



Controller

Controller and power supply for Optoelectronic Transducers
Type 720.0032/0042/06XX
Separate relays and indications for DRY/WET
Continuous self checking of sensor, connections and controller
Manual Test of relay and external signal devices by TEST-button

Product group **720**

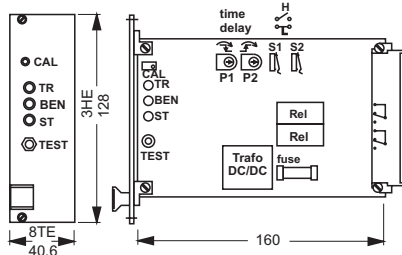
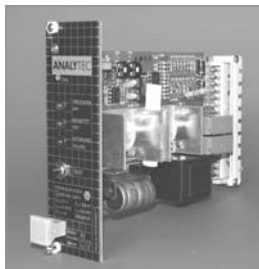
Type **250Y**

Sheet: 1/1

Revision: 7

Date:

2/05



Type 19"-plug in module. Rack connector 32-pole DIN 41612 Form F. Switches for setting of switch direction and time delay. Pots for time delay are protected. Cal pot and TEST button are on front panel.

Field of application

The Controller will be operated in safe area. The output is intrinsically safe Ex ib IIC and for use with the transducer Type 720.06XX only.

General Data

Function modes: Switch direction H or L settable
Rise and falltime for relay signal settable appr. 8 s

Fail safe modes: Short circuit, open circuit interruption between sensor and controller voltage failure, sensor component failure

Design Data

Ambient temperature
19"-plug in module: -25 to +60 °C
Housing: -40 to +40 °C

Weight
19"-plug in module: 0,31(0,36) kg
Housing: 0,6 (0,73) kg

Controller output: II (2) G [Ex ib] IIC
Inductivity L_{max}: 0.5 mH
Capacity C_{max}: 3 µF
U: ≤9.6 V
I: ≤149 mA
P: ≤1.0 W

Electrical Data

Power supply voltage: 230/115/120/24 V~/24 V=

Power consumption: 2,8 VA/3 W

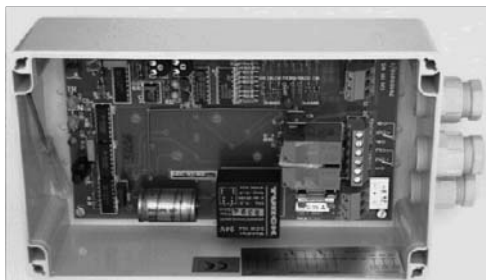
Outputs: Signal-Relay, SPDT, 250 V/3 A/100 VA
Failure-Relay, SPDT, 250 V/3 A/100 VA

Cable glands: M16x1,5/M20x1,5 blue for Ex

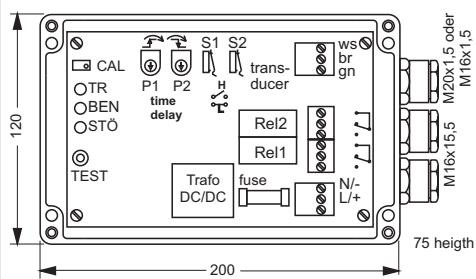
Wire cross section max.: 2,5 mm²

Cable length: 175 - 600 m for 0.5 - 1.5 mm²

Ingress protection EN 60529:
19"-plug in module: IP 20
housing: IP 65

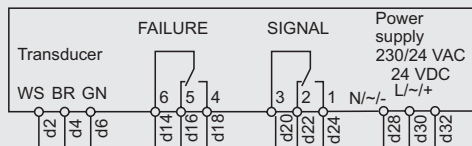


Housing Type. The housing is covered with a transparent lid, so that LEDs for DRY, WET and FAILURE can be seen. Ingress protection IP65 ensures that this controller can be used outside.



Measures in mm

Connection Diagram



Certificates

EC-Type Examination Certificate: ZELM 02 ATEX 0106 (also valid for ASEV)

SIL level acc. to IEC 61508: SIL1, in connection with transducer type 720.06XX

Subject to alterations

Ordering No.

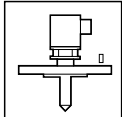
7 2 0 . 2 5 0 Y . X X

Type	Standard	1				
	Ex	2				
Supply	230 V/50...60 Hz		1			
	115/120 V/50...60 Hz		2			
	24 VAC/50...60 Hz		3			
	24 VDC with isolation		4	1	Plastic housing	Housing
	24 VDC without isolation		7	7	19"-plug-in module	

PHÖNIX

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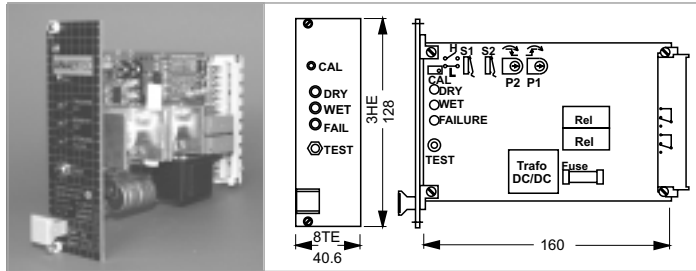
PHÖNIX



Controller

Controller and power supply for Optoelectronic Transducers
Type 720.0032/0042/06XX
Separate relays and indications for DRY/WET
Continuous self checking of sensor, connections and controller
Manual Test of relay and external signal devices by TEST-button

Product group	720	
Type	0250	
Sheet:	1/1	Revision: 4
Date:	7/03	



Type 19"-plug in module. Rack connector 32-pole DIN 41612 Form F. Switches for setting of switch direction and time delay. Pots for time delay are protected. Cal pot and TEST button are on front panel.

Field of application

Combined with a transducer Type 720.06XX the controller is part of an Overfill prevention device approved acc. to German WHG§19

General Data

Function modes: Switch direction H or L settable
Rise and falltime for relay signal settable appr. 8 s

Fail safe modes: Short circuit, open circuit interruption between sensor and controller voltage failure, sensor component failure

Design Data

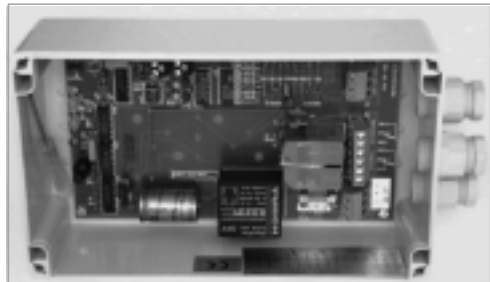
Ambient temperature
19"-plug in module: -25 to +70 °C
Housing: -40 to +40 °C

Weight
19"-plug in module: 0,31(0,36) kg
Housing: 0,6 (0,73) kg

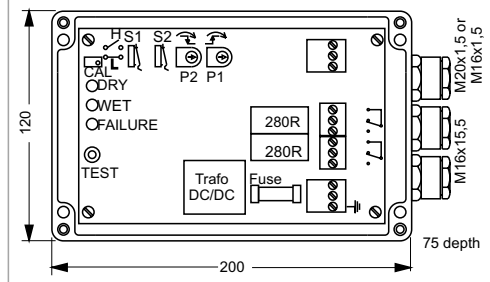
Electrical Data

Power supply voltage: 230 V~/24 V~/24 V=
Power consumption: 2,8 VA
Outputs: Signal-Relay, SPDT, 250V/4A
Failure-Relay, SPDT, 250V/4A

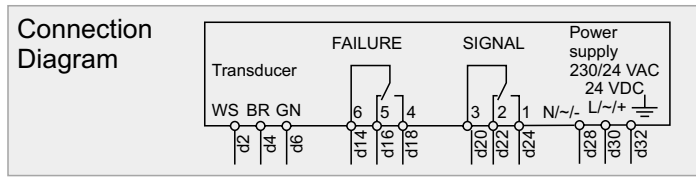
Cable glands: PG11/PG 13,5, blue for Ex
Wire cross section max.: 2,5 mm²
Cable length: 175 - 600 m for 0.5 - 1.5 mm²
Ingress protection EN 60529:
19"-plug in module: IP 20
housing: IP 65



Housing Type. The housing is covered with a transparent lid, so that LEDs for DRY, WET and FAILURE can be seen. Ingress protection IP65 ensures that this controller can be used outside.



Measures in mm



Certificates

Overfill prevention device
in combination with transducer
Type 720.06XX, acc. to WHG §19: DIBt Z-65.14-1
subject to alterations

Ordering No.

7 2 0 . X 6 0 2 X X 0 0 0 . 0 2 5 0

Appl.	Standard	1	1	230 V/50...60 Hz	Supply
	Ex	2	2	115/120 V/50...60 Hz	
			3	24 VAC/50...60 Hz	
Version	Housing Makrolon	1	4	24 VDC with transformer	
	19"-plug in module	7	7	24 VDC not galvanically isolated	

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