DANA BREVINI® Motion Systems

DC7A1A1_A10-000R0
12 2023

Product Catalog

Brevini® Electronics
Sensoring and Control

Advanced solutions

Reliable Technology

Single or Dual channel electronic sensors and control units
for machine position measurement and safety load limitation


DANA
BREVINI®
Motion Systems

Dana has introduced the introductive index and bookmars, which allow you to arrive and print the relevant section faster.
Clicking the Dana logo at the bottom page, you'll come back to the index

DANA
BREVINI®
Motion Systems

Reliability and precision for mobile machines

With over 30 years of experience, born from the legacy of BPE Electronics, Dana Sensoring and Control is today a leader in the design and manufacture of sensors and electronic controllers for mobile machines, offering a complete range of products that can meet the needs of a wide range of applications, in the material handling, earthmoving, agricultural, forestry and construction sectors.

Quality oriented

Our products are designed and manufactured to offer maximum precision and reliability, in accordance with international standards, and are subjected to rigorous testing to ensure compliance with the highest quality standards.

The range includes:
- Angle, tilt, and length sensors
- Load cells
- Pressure transducers
- Electronic controllers

Our sensors are available in a wide variety of configurations, both single and dual channel, designed to meet safety requirements and suitable for fail safe applications.

Angle and length measurements can be embedded into a single device, making the installation outside or inside a telescopic boom easier.

Load cells can be fully customized, both from a mechanical and electrical point of view. The dedicated study to define cavities shape and strain gauges position is carried out internally by our team of engineers.
The electronics for signal amplification and conditioning can be integrated into the body of the sensor, reducing the overall dimension, and simplifying the wiring.

All sensors can be connected to our programmable electronic controller, capable of integrating specific anti-tilting functions and advanced machine control. The parametrization of any functional characteristic makes the solution flexible, adjustable, and adaptable to a wide range of applications.

Recognized value

The extensive field experience and the collaboration with our partners have allowed us to continuously improve our products, which are now recognized for their high robustness and reliability over time.

TAC MkII Series — Angle digital transducer

General Features

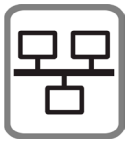
- Programmable digital device to measure tilt on one axis
- Working range ±90°, ±135°, ±180°
- MEMS technology angular sensor (no moving parts)
- Factory programmed on custom request
- Voltage, current, ratiometric or CAN bus output
- Double device version in single housing
- Hardware and software filters to remove vibrations and interferences
- Inputs/outputs protected against polarity reversal, over voltages and short circuits
- Housed in a tough and compact shell made of glass fiber reinforced Nylon 6
- Electrical connection with M12x1 connectors

On request:
Customizable angle range
Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.

MEMS sensor technology

Full angle range

Protection Grade IP66/IP67


CAN bus connection


Single or double channel


Double crossed channel

Wide temperature range


Sturdy construction

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratio-metric	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption [1] **[double]**	10 [20] mA	30 [60] mA		30+20 [60+40] mA

[1] Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Angular range	from 0 to 360 degrees
Angular transducer (linearity, hysteresis, repetibility) accuracy	±0.50 degrees
Angular transducer resolution	0.1degrees
Angular transducer temperature drift	± 0.01 degrees /°C
Std cable length	30 cm
Operating temperature	from -40 to +80 °C
Maximum weight	0.25 kg
Housing material	glass fiber reinforced Nylon 6
Coating	Two components polyurethane
Standard protection grade	IP66 / IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3 | EN 13309 [3]
Vibration resistance: Sinus	EN 60068-2-6: 10 g, 10 – 150 Hz
Shock resistance: Shock	EN 60068-2-27: 200 g, 6 ms
MTTFd (electronic board)	EN 13849-1: ≥ 100 years (for every channel)

[3] Excluding Pulse 5 (ISO 7637)

Ordering Code

1		2		3		4		5		6		7		8
Transducer type		Channels		Rotation direction		Rotation angles		Otput type		Electrical connection		CAN termination		Mechanical fitting
TAC MkII		D		W		180		99		M21		N		N

1

Transducer type	
TAC MkII	Angle digital transducer

2

Channels	
S	Single channel
D	Double channel
R	Double channel with crossed signals

3

Rotation direction	
W	Clockwise rotation direction
C	Counterclockwise rotation direction

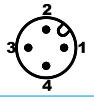
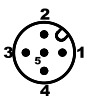
4

Rotation Angles	
180	± 90°
270	± 135°
360	± 180° For CAN version only

5

Output type		
4 _	Current output: 4 to 20 mA	(single)
5 _	Ratiometric output: 10% to 90% VIN. VIN=+5 VDC	(single)
7 _	CAN output: CAN bus	(single)
9 _	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
55	Ratiometric output: 10% to 90% VIN. VIN=+5 VDC	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

6

Electrical connection			
M70	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN=9 to 33 VDC 2: Negative power supply 3: Signal	
M71	double channel		
M20	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN=9 to 33 VDC 2: Negative power supply 3: Signal	
M21	double channel		
M44	single channel	**Ratiometric output** (10% to 90% VIN) M12 plug 1: VIN=5 VDC 2: Negative power supply 3: Signal	
M48	double channel		
M07	single or double	**CAN bus output** 1: Cable shield 2: VIN=9 to 33 VDC 3: Negative power supply 4: CH 5: CL	

7

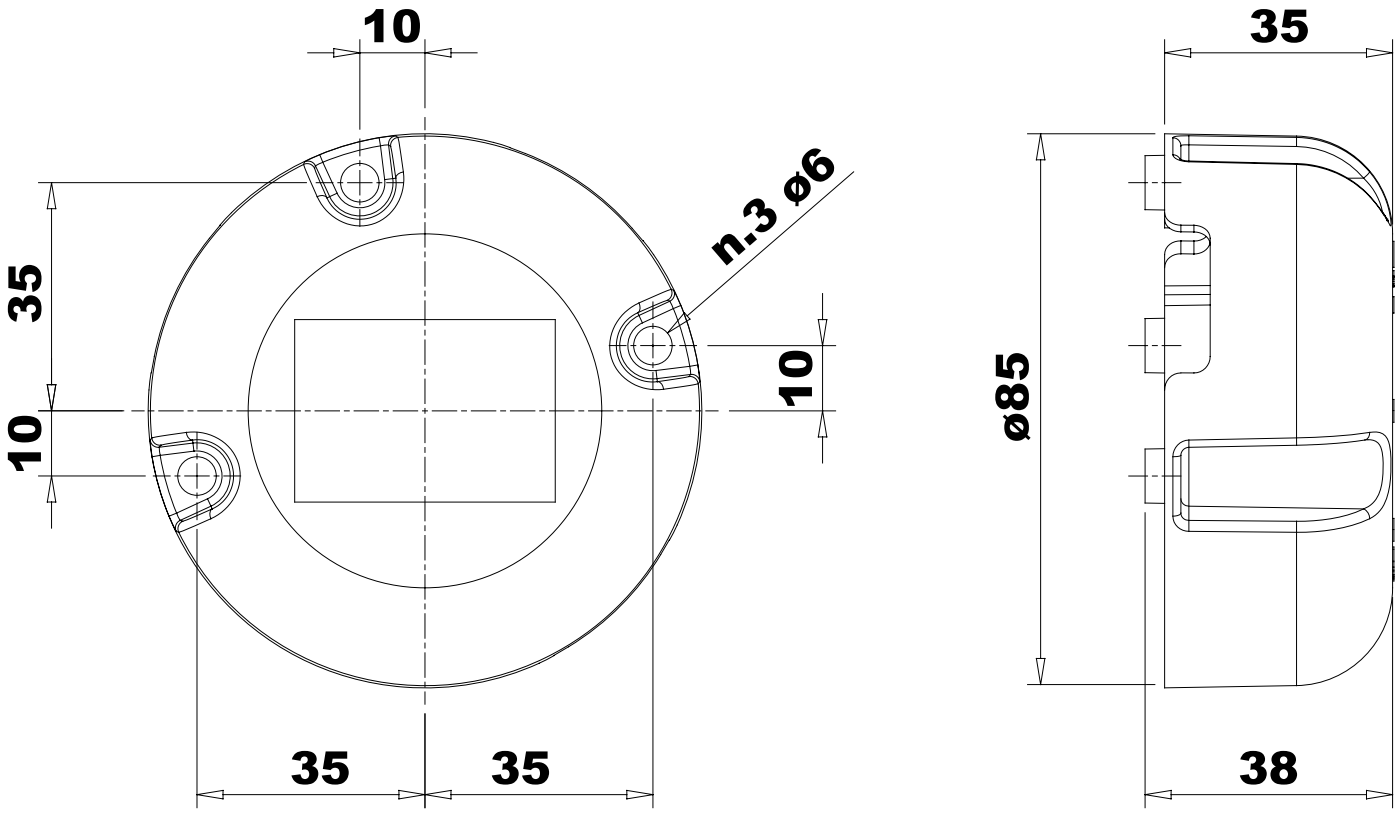
CAN termination	
N	Without embedded CAN bus termination

8

Mechanical fitting	
N	Standard (see dimensions drawing)

Custom configuration are available on request

Dimensions



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Female Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
CAN Male Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
CAN cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 receptacle connector cap with 120 Ohm network termination.
CAN Network male Termination	M12 plug connector cap with 120 Ohm network termination.

General Features

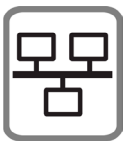
- Programmable digital device to measure tilt on two axes
- Two analog outputs, X and Y axes
- Working range ±20°
- MEMS technology angular sensor (no moving parts)
- Factory programmed on custom request
- Voltage, current, ratiometric or CAN bus output
- Double version in the same shell (CAN bus version only) for systems that require redundant signals
- Hardware and software filters to remove vibrations and interferences
- Inputs/outputs protected against polarity reversal, over voltages and shortcircuits
- Housed in a tough and compact shell made of glass fiber reinforced Nylon 6
- Electrical connection with M12x1 connectors

On request:
Working range configurable
Temperature compensation
Vertical installation (factory set)
Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.

MEMS sensor technology

X and Y axis

Protection Grade IP66/IP67


CAN bus connection


Single or double channel

Wide temperature range


Sturdy construction

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratio-metric	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption [1] [double]	10 [20] mA	30 [60] mA		30+20 [60+40] mA

[1] Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Intervention range	from -20 to +20 degrees
Transducer (linearity, hysteresis, repetibility) accuracy	0.5% FS for angles lower than ±10° and 1.0% FS over ±10° and until ±20° (FS=40°)
Angular transducer resolution	0.025 degrees (0.015 degrees for CAN bus version)
Angular transducer temperature drift (zero point)	±0.008 degrees/°C [2] (typical)
Standard cable length	30 cm
Operating temperature	from -40 to +80 °C
Maximum weight	0.25 kg
Housing material	glass fiber reinforced Nylon 6
Coating	Two components polyurethane
Standard protection grade	IP66 / IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3 | EN 13309 [3]
Vibration resistance: Sinus	EN 60068-2-6: 10 g, 10 – 150 Hz
Shock resistance: Shock	EN 60068-2-27: 200 g, 6 ms
MTTFd (electronic board)	EN 13849-1: ≥ 100 years (for every channel)

[2] For conpensated devices, zero point: ±0.002 degree/°C. For compensated devices, gain: ±0.001 degree/°C
[3] Excluding Pulse 5 (ISO 7637)

Ordering Code

1		2		3		4		5		6		7		8
Transducer type		Channels		Axes angle range		Output type		Electrical connection		CAN termination		Mechanical fitting		Thermal compensation
SP MkII		S		20/20		9		M35		N		N		N

1

Transducer type	
SP MkII	Digital inclinometer

2

Channels	
S	Single channel
D	Double channel (CAN only)

3

Axes angle range	
20/20	Maximum angle equal to 20/20 degrees

4

Output type		
4 _	Current output: 4 to 20 mA	(single)
5 _	Ratiometric output: 10% to 90% VIN. VIN=+5 VDC	(single)
7 _	CAN output: CAN bus	(single)
9 _	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
7 7	CAN output: CAN bus	(double)

5

Electrical connection			
M60	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN=9 to 33 VDC 2: Negative power supply 3: X axis 4: Y axis	
M35	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN=9 to 33 VDC 2: Negative power supply 3: X axis 4: Y axis	
M49	single channel	**Ratiometric output** (10% to 90% VIN) M12 plug 1: VIN=5 VDC 2: Negative power supply 3: X axis 4: Y axis	
M07	single or double	**CAN bus output** 1: Cable shield 2: VIN=9 to 33 VDC 3: Negative power supply 4: CH 5: CL	

6

CAN termination	
N	Without embedded CAN bus termination

7

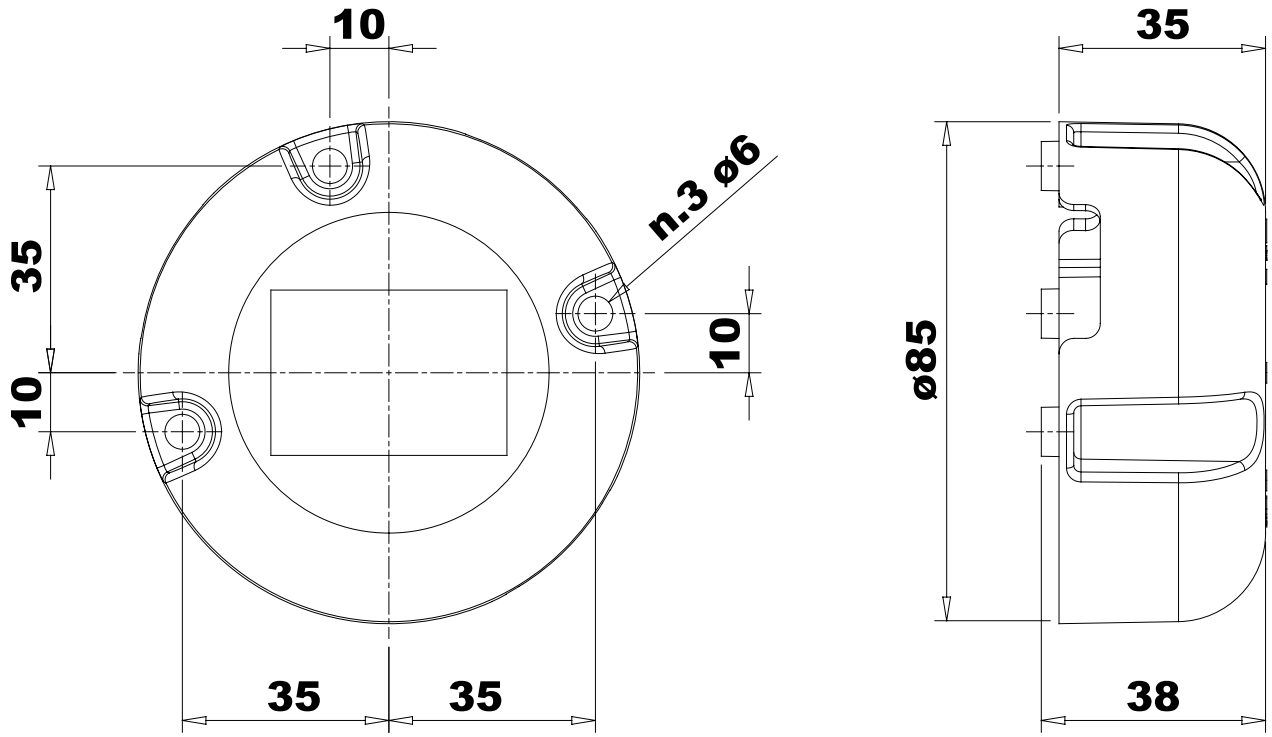
Mechanical fitting	
N	Standard (see drawing below)

8

Thermal compensation	
N	Not compensation

Custom configuration are available on request

Dimensions



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
CAN cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
CAN cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
CAN Network male Termination	M12 5 pin plug connector cap with CAN network termination.

General Features

- Programmable micro controller device able to measure tilt on two axes
- Up to two supplementary outputs for axes or four for semi-axes
- MEMS technology (no moving parts). Can be mounted upside down.
- Safety level up to PLd (EN 13849-1)
- Could be factory programmed with custom configuration
- Programmable intervention range from -20 to +20 degrees
- Planarity output with free polarized relay contact or positive transistor
- Positive transistor axes or semi-axes outputs
- Hardware and software filtering to remove vibrations and noise
- Inputs and outputs protected against polarity inversion and short circuit
- Waterproof, plastic, compact body (glass fiber reinforced Nylon 6)
- Easy setup BPE software (RS-232 connection)
- External zero wire to store the planarity offset

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.
Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

MEMS sensor technology | Intervention range | Protection Grade IP66/IP67 | Easy PC setup with BPEterminal | Wide temperature range | Vertical mounting | Four semi-axes | Automatic levelling

Technical Data

Technical data	Transistor ID output	Relay ID output
Power supply	9 to 33 VDC	12 VDC: from 9 to 16.8 VDC @ 20°C [2] 24 VDC: from 18 to 33 VDC @ 20°C [2]
Axes and semi-axes outputs max current	1.5 A (2.5 A if only one output is activated) [3]	
Planarity output max current	Positive: 3.0 A / Negative: 0.6 A	3.0 A [4]
Power draw	30 mA [5]	
Intervention range	from –20 degrees to +20 degrees on every axis	
Accuracy	1% FS	
Resolution	0.025 degrees	
Temperature drift (zero point)	±0.008 degrees/°C (typ.)	
Operating temperature	from -40 to +70 °C [6]	
Maximum weight	0.25 kg	
Housing material	glass fiber reinforced Nylon 6	
Sealing	two component polyurethane resin	
Standard protection grade	IP66 / IP67	
Standard cable length	45 cm	
Buzzer (Optional)	105dB, alternating tone, IP54	
CE conformity	EMC Directive: 2014/30/EU Machine Directive: 2006/42/EC	
EMC: Immunity / Emission	EN 61000-6-2, EN61000-6-3 / EN 13309 [7]	
Vibration resistance – Sinus	EN 60068-2-6: 10 g, 10 to 150 Hz	EN 60068-2-6: 5g, 10 to 150Hz
Shock resistance – Shock	EN 60068-2-27: 200 g, 6 ms	EN 60068-2-27: 30g, 6ms
MTTFd	EN 13849-1: ≥ 100 years (for every channel) for the planarity transistor output version	

[1] Planarity relay output must be protect with an external fuse (not supplied)
[2] 12 VDC: from 10.2 to 16.2 VDC @ 70°C. 24 VDC: from 20.4 to 32.4 VDC @ 70°C
[3] Mutually exclusive, maximum two contemporary enabled
[4] Protected by external fast fuse
[5] Without loads on the output
[6] From -20 to +70 °C for Cat. 3
[7] Excluding Pulse 5 (ISO 7637)

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Switch type	Power supply	Main output	Safety level	Axes output	Alarm levels	Angular zone	RS-232 serial port cable	Zero setting cable	Electrical connection	Flange	Buzzer	Placement	Support digital output
IDXYmP MkII	UNI	NT C	PLb_	4AP_ A	1	R	PC	SWZ	C80	N	N	H	0

1

Switch type	
IDXYmP MkII	Tilt switch
IDXYmP-ID3 MkII	Tilt switch

2

Power supply	
12V	12 VDC power supply
24V	24 VDC power supply
UNI	Power supply from 9 to 33 VDC. No “CR” output. No buzzer.

3

Main output		C Output closed when in planarity condition	A Output opened when in planarity condition, performance level equal to PLb (EN 13849-1)
CR	IDXYmP-ID3: polarized relay output IDXYmP: free relay output	●	●
PT	Positive transistor output	●	●
NT	Negative transistor output	●	●

4

Safety level	
NOT_	Main “ID” output safety or performance level equal to nothing
PLb_	Main “ID” output performance level equal to PLb (EN 13849-1)

5

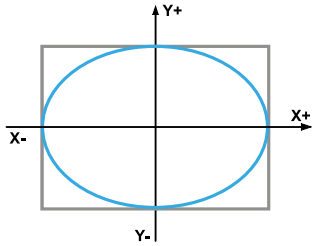
Axes output		C Semi-axes outputs closed when in planarity condition	A Semi-axes outputs opened when in planarity condition
NOT_N	No semi-axes outputs	-	-
4AP_	Four positive semi-axes outputs	●	●

6

Alarm levels	
1	Standard

7

Angular zone	
R	Rectangular angular response
E	Elliptical Rectangular angular response (for main output only)



Blue ellipsis:
elliptical angular response.
Gray rectangle:
rectangular angular response.

They define the region where outputs change their value.

Default programming:
Main ouput: 3.0 degrees
Axes outputs: 1.5 degrees
Activation delay: 1 seconds

● Available
- Not Available

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Switch type	Power supply	Main output	Safety level	Axes output	Alarm levels	Angular zone	RS-232 serial port cable	Zero setting cable	Electrical connection	Flange	Buzzer	Placement	Support digital output
IDXYmP MkII	UNI	PT C	PLb_	4AP_ A	1	R	PC	SWZ	C80	N	N	H	0

8

RS-232 serial port cable	
NO	Without serial connection for configuration and calibration
PC	Elliptical Rectangular angular response (for main “ID” output only)

9

Zero setting cable	
SWZ	With external wire for zero calibration

10

Electrical connection	
C80	45cm free cables (for IDXYmP only)
C90	45cm free cables (for IDXYmP-ID3 only)

11

Flange	
F	With flange and spacers
M	With flange and springs
N	Without flange

12

Buzzer	
N	Without buzzer
Z	With buzzer

13

Placement	
H	Horizontal mounting
V	Vertical mounting

14

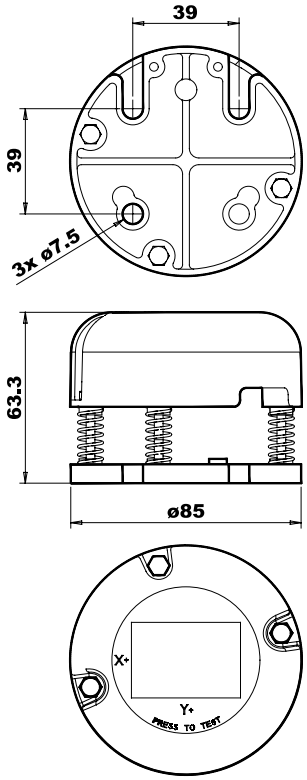
Support digital output	
0	Supplementary digital output not available in standard configurations

Possible configurations

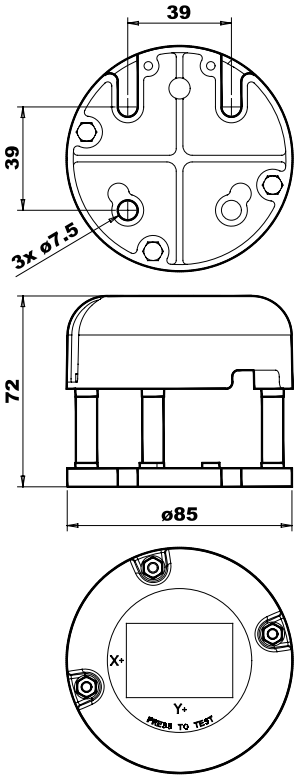
IDXYmP MkII	12V 24V	CR	C	PLb_	NOT_ 4AP_	N C A	1	R E	NO PC	SWZ	C80	F M	N Z	H V	0
			A	NOT_											
	UNI	PT	C	PLb_								F M N	N		
			A	NOT_											
		NT	C	PLb_											
			A	NOT_											
IDXYmP-ID3 MkII	12V	CR	C	NOT_	NOT_ 4AP_	N C A	1	R E	NO PC	SWZ	C90	F M	N Z	H V	0
	24V											N	N		
	UNI	PT	C	PLb_	NOT_ 4AP_	N C A	1	R E	NO PC	SWZ	C90	F M N	N		

Custom configuration are available on request

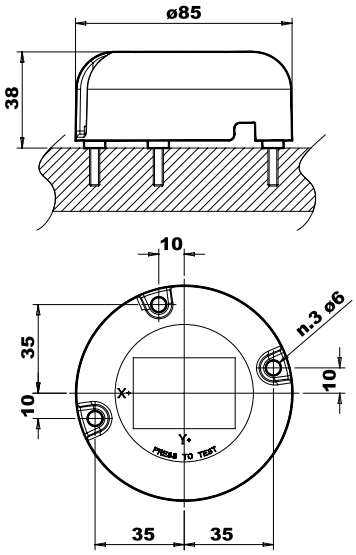
Dimensions [mm]



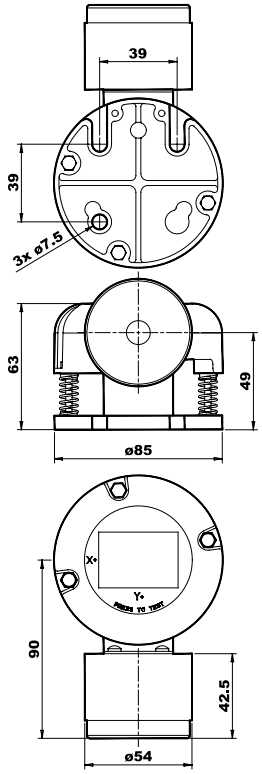
M: With flange and springs



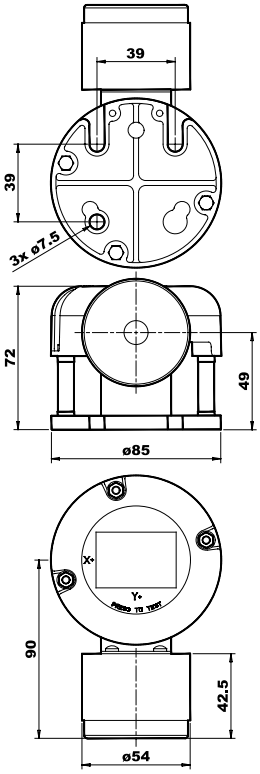
F: With flange and spacers



N: Without flange



M Z: With spring and buzzer

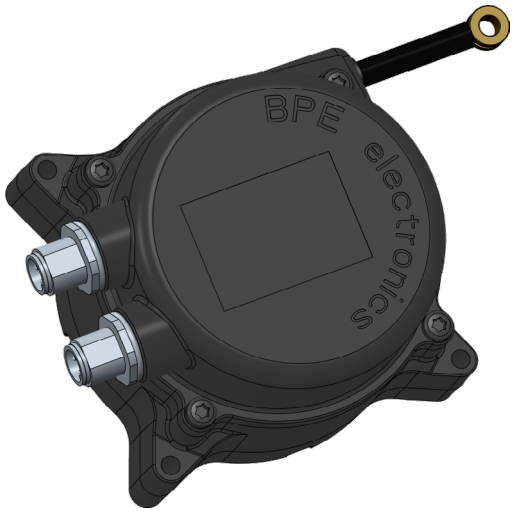


F Z: With spacers and buzzer

Accessories

Type	Description
Fitting kit	Springs and flange kit
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 serial connection cable L=4m; • 1 AMPSSEAL/Modu2 serial adapter; • 1 USB adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
AMP Sseal/Modu2 serial adapter	3p connector adapter for serial cables.
USB adapter	USB/RS-232 DB9 adapter

General features



- Compact length transducer
- Single or double channel for PL d (EN13849-1) systems.
- Voltage, current, ratiometric or CAN bus output
- Waterproof, plastic, compact body
- Easy to install
- PA12-coated 7x19 AISI 316 stainless steel rope
- Ninety degrees orientable electrical connection with M12x1 connectors
- Rope fixing ring for easy and quick installation

On request:
Electrical connection with cable gland

Typical fields of application:
Truck mounted cranes, mobile cranes, aerial platforms, inside extensible outriggers, industrial automation and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

66 mm only thickness

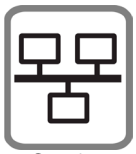
5 m max length

90° orientable

Ultra durable

7x19 stainless steel rope

Protection Grade IP66/IP67


Can bus connection

Wide temperature range


Single or double channel

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratiometric	0.5 to 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption [1] [double]	10 [20] mA	30 [60] mA		30+20 [60+40] mA

[1] Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 4.0 m	5.0 m
Length sensor (linearity, hysteresis, repetibility) accuracy	±0.50% FS	±0.75% FS
Length transducer resolution	0.03% FS	
Length transducer temperature drift	< 100 ppm / °C	
Rope diameter (with coating)	0.9 (1.1) mm	
Rope breaking force	615 N	
Min/max force to pull out the rope	3.8/7.0 N	
Max wire speed	3 m/s	
Max wire acceleration	5 m/s^2	
Operating temperature	from -40 to +70 °C	
Maximum weight	0.60 kg	
Electric insulation	6500 VAC	
Housing material	PC/ABS	
Standard protection grade (electronics and spring box)	IP66 / IP67	
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3	
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	
MTTFd (electronic board)	EN 13849-1: ≥ 100 years	
Maximum number of mechanical cycles	5x10^5	

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12
Transducer type	Length	Channel	Rope output	Steel rope	Ring type	Output type	Electrical connection	Electrical outlet	Connector type	CAN termination	Potentiometer
TLu66	5.0	D	UR	3	R	99	M31	3	M12	N	P5

1

Transducer type	
TLu66	Micro length transducer

2

Length	
3.5	length = 3.5 m
4.0	length = 4.0 m
5.0	length = 5.0 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Rope output		
UR	Steel rope outlet on upper right side	
UL	Steel rope outlet on upper left side	
LR	Steel rope outlet on lower right side	
LL	Steel rope outlet on lower left side	

5

Steel rope	
3	AISI 316 stainless steel polyamide coated rope PA12 0.9/1.1 mm 7x19

6

Ring type	
R	With metallic ring at the end of the steel rope (IN/ OUT: 5/10 mm)

7

Output type		
4_	Current output: 4 to 20 mA	(single)
5_	Ratiometric output: 10% to 90% VIN (+ 5 VDC)	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
55	Ratiometric output: 10% to 90% VIN (+ 5 VDC)	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12
Transducer type	Length	Channel	Rope output	Stel rope	Ring type	Output type	Electrical connection	Electrical outlet	Connector type	CAN termination	Potentiometer
TLu66	5.0	2	UR	3	R	99	M31	3	M12	N	P5

8

Electrical connection		
M75	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected
M76	double channel	
M30	single channel	**Voltage output** (10.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected
M31	double channel	
M40	single channel	**Ratiometric output** (10% to 90% VIN) M12 plug 1: VIN = 5 VDC 2: Length signal 3: Negative power supply 4: Not connected
M41	double channel	
M07	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL M12 plug M12 receptable

9

Rope output	
0	Electrical outlet to hours “0” or “12”
3	Electrical outlet to hours “3”
6	Electrical outlet to hours “6”
9	Electrical outlet to hours “9”

10

Connector type	
M12	Electrical connection type: M12

11

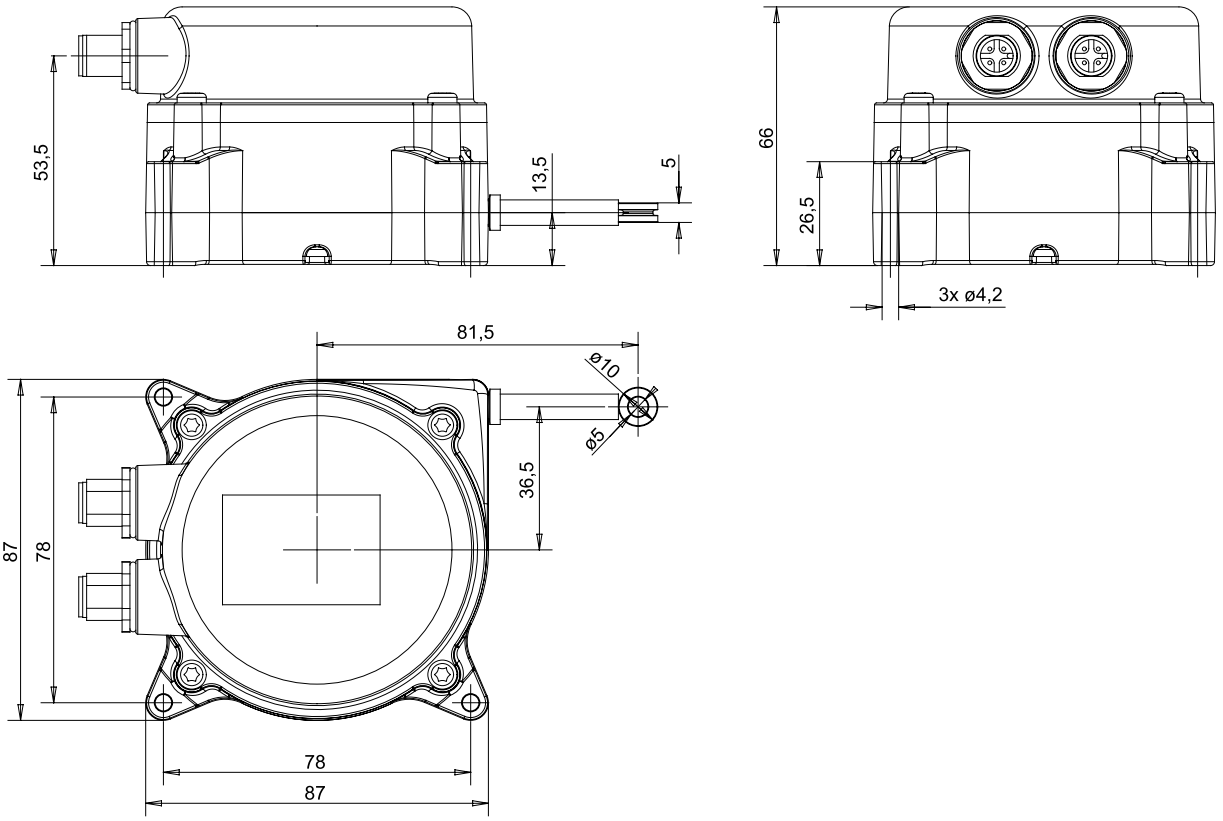
CAN termination	
N	Without embedded CAN bus termination

12

Potentiometer	
P5	Potentiometer type: 10 KΩ, 1 round, 5 x 10^5 cycles

Custom configuration are available on request

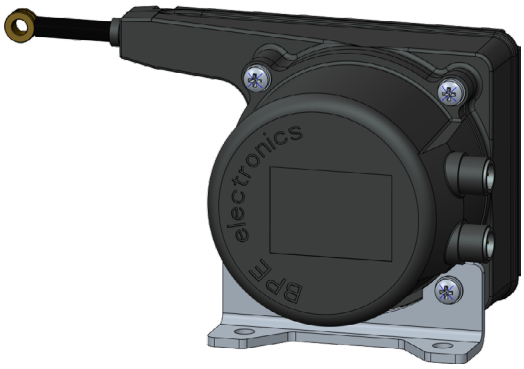
Dimensions [mm]



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
CAN cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
CAN cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
CAN Network male Termination	M12 5 pin plug connector cap with CAN network termination.
Adapter	Ring to threaded rod adapter

General features



- Compact length transducer
- Single channel. Possible to have it with double channel for PL d (EN13849-1) systems
- Voltage, current, ratiometric or CAN bus output
- Waterproof, plastic, compact body
- Easy to install
- PA12-coated 7x7 AISI 316 stainless steel rope
- Ninety degrees orientable fixing bracket
- Ninety degrees orientable electrical connection with M12x1connectors
- Rope fixing ring for easy and quick installation

Typical fields of application:
Truck mounted cranes, mobile cranes, aerial platforms, inside extensible outriggers,

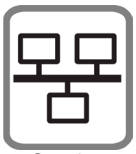
Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

5 m max length

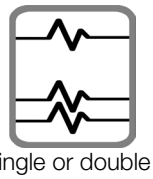
84.5 mm only tickness

90° orientable

Protection grade IP66


Can bus connection

Wide temperature range


Single or double channel


Double crossed channel

Technical Data

Power supply	from 0 to 33 VDC	from 9 to 33 VDC		
Outputs	Ratiometric: 10% to 92% VIN For 5.5m: 10% to 89% VIN	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	-	10 mA	-	-
Current consumption (1) [double]	3.3 [6.6] mA	30 [60] mA		30+20 [60+40] mA

(1) Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 4.0m	5.5m
Length sensor (linearity, hysteresis, repetibility) accuracy	± 0.50% FS	± 0.75% FS
Length transducer resolution	0.03% FS	
Length transducer temperature drift	< 100 ppm / °C	
Rope diameter (with coating)	0.63 (0.80) mm	
Rope breaking force	320 N	
Min/max force to pull out the rope	3.0/6.0 N	
Max wire speed	3 m/s	
Max wire acceleration	5 m/s^2	
Operating temperature	from -40 to +70 °C	
Maximum weight	0.60 kg	
Electric insulation	6500 VAC	
Housing material	PA 6.6 + 35% glass reinforced and mineral filled	
Standard protection grade (electronics and spring box)	IP66	
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3	
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	
MTTFd (electronic board)	EN 13849-1: ≥ 100 years	
Maximum number of mechanical cycles	$1x10^5$ ($5x10^5$ on request)	

Ordering Code

1	2	3	4	5	6	7	8	9	10	11
Transducer type	Length	Channel	Steel rope	Ring type	Electrical type	Electrical connection	Electrical outlet	Mounting bracket	CAN termination	Potentiometer
TLu	2.0	D	1	R	7_	M31	3	S6	N	P1

1

Transducer type	
TLu	Micro length transducer

2

Length	
2.0	length = 2.0 m
4.0	length = 4.0 m
5.5	length = 5.5 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Steel rope	
1	AISI 316 stainless steel polyamide coated rope PA12 0.63/0.80 mm 7x7

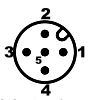
5

Ring type	
R	With metallic ring at the end of the steel rope (IN/ OUT: 5/10 mm)

6

Electrical type		
4_	Current output: 4 to 20 mA	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC	(single)
44	Current output: 4 to 20 mA	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC	(double)

7

Electrical connection			
M75	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected	
M76	double channel		
M30	single channel	**Voltage output** (10.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected	
M31	double channel		
M06	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL	 M12 plug

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11
Transducer type	Length	Channel	Steel rope	Ring type	Electrical type	Electrical connection	Electrical outlet	Mounting bracket	CAN termination	Potentiometer
TLu	2.0	D	1	R	7_	M31	3	S6	N	P1

8

Electrical outlet	
0	Electrical outlet to hours “0” or “12”
3	Electrical outlet to hours “3”
6	Electrical outlet to hours “6”
9	Electrical outlet to hours “9”

9

Mounting bracket	
S0	Electrical outlet to hours “0” or “12”
S3	Electrical outlet to hours “3”
S6	Electrical outlet to hours “6”
S9	Electrical outlet to hours “9”

10

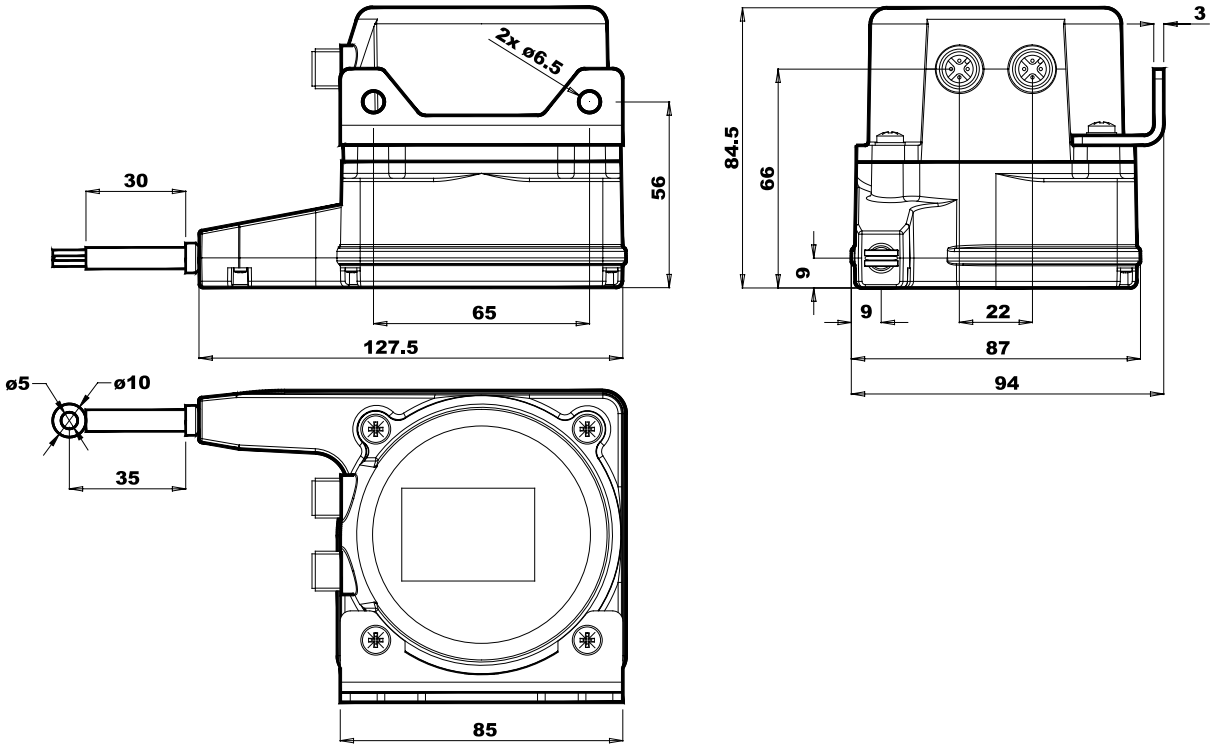
CAN termination	
N	Without embedded CAN bus termination

11

Potentiometer	
P1	Potentiometer type: 10 KΩ, 10 rounds, 1 x 10^5 cycles
P3	Potentiometer type: 10 KΩ, 5 rounds, 1 x 10^5 Cycles. For 2.0 meters only
P4	Potentiometer type: 10 KΩ, 10 rounds, 5 x 10^5 cycles

Custom configuration are available on request

Dimensions [mm]

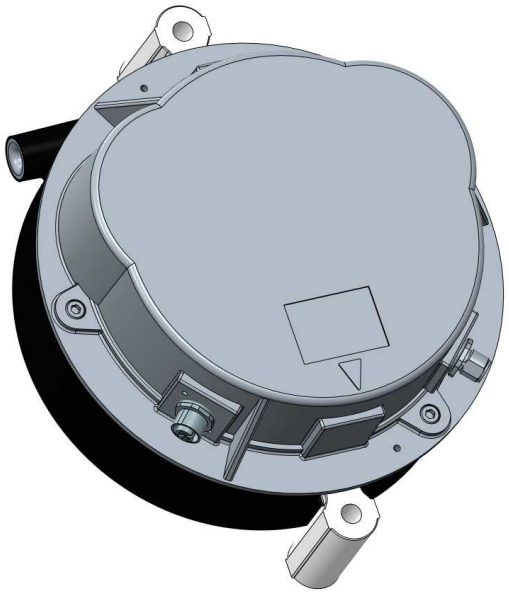


Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 15m female / Stripped wires	Length 15m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 15m female / Stripped wires	Length 15m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
Adapter	Ring to threaded rod adapter

General features

- Single channel. Possible to have it with double channel for PL d (EN13849-1) systems
- Voltage, current, ratiometric or CAN bus output
- Electrical connection with M12x1 connectors
- Standard length: 8.5 and 12.5 meters
- PA12-coated 7x7 AISI 316 stainless steel rope
- Waterproof, compact aluminium body
- Easy to install
- Right or left side mounting version
- Provided with a plastic casing to protect the pulley



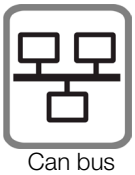
On request:
- Special length
- Electrical connection with cable

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

12.5 m max length

Protection Grade IP65


Can bus connection


Sturdy construction


Single or double channel


Double crossed channel

Technical Data

Power supply	from 0 to 33 VDC	from 9 to 33 VDC		
Outputs	Ratiometric: 10% to 90% VIN	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	-	10 mA	-	-
Current consumption (1) [double]	3.3 [6.6] mA	30 [60] mA		30+20 [60+40] mA

(1) Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 12.5m
Length transducer (linearity, hysteresis, repetibility) accuracy	± 1.0% FS
Length transducer resolution	0.03% FS
Length transducer temperature drift	< 100 ppm / °C
Rope diameter (with coating)	1.5 (2.0) mm
Rope breaking force	> 1000 N (greater than)
Min/max force to pull out the rope	9,5 N (± 40 %)
Max wire speed	3 m/s
Max wire acceleration	5 m/s^2
Operating temperature	from -25 to +70 °C
Maximum weight	2.3 kg
Housing material	aluminium body/ plastic pulley and casing
Standard protection grade (electronics and spring box)	IP65
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz
MTTFd (electronic board)	EN 13849-1: ≥ 100 years
Maximum number of mechanical cycles	$1x10^5$ ($2.5x10^5$on request)

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12
Transducer type	Length	Channel	Rope output	Steel rope	Supplementary rope	Electrical output	Electrical connection	Electrical outlet	CAN termination	Potentiometer	Casing type
TL	08.5	D	UL	5	F4	99	M31	D	N	P1	C

1

Transducer type	
TL	Length transducer

2

Length	
08.5	length = 8.5 m
12.5	length = 12.5 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Rope output		
UR	Steel rope outlet on upper right side	
UL	Steel rope outlet on upper left side	
LR	Steel rope outlet on lower right side	
LL	Steel rope outlet on lower left side	

5

Steel rope	
5	AISI 316 stainless steel polyamide coated rope PA12 1.5/2.0 mm 7x7

6

Supplementary rope	
F4	Supplementary steel rope length (Standard: 04 meters)

7

Electrical output		
3_	Ratiometric output: see “Outputs” on previous table	(single)
4_	Current output: 4 to 20 mA	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC	(single)
33	Ratiometric output: see “Outputs” on previous table	(double)
44	Current output: 4 to 20 mA	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC	(double)

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12
Transducer type	Length	Channel	Rope output	Steel rope	Supplementary rope	Electrical output	Electrical connection	Electrical outlet	CAN termination	Potentiometer	Casing type
TL	08.5	D	UL	5	F4	99	M31	D	N	P1	C

8

Electrical connection		
M75	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected
M76	double channel	
M30	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected
M31	double channel	
M55	single channel	**Ratiometric output** M12 plug 1: VIN = 0 to 33 VDC 2: Length signal 3: Negative power supply 4: Not connected
M56	double channel	
M06	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL

M12 plug

M12 receptable

9

Electrical outlet	
L	Electrical connector used: left
R	Electrical connector used: right
D	Electrical connector used: both (for double transducers)

10

CAN termination	
N	Without embedded CAN bus termination

11

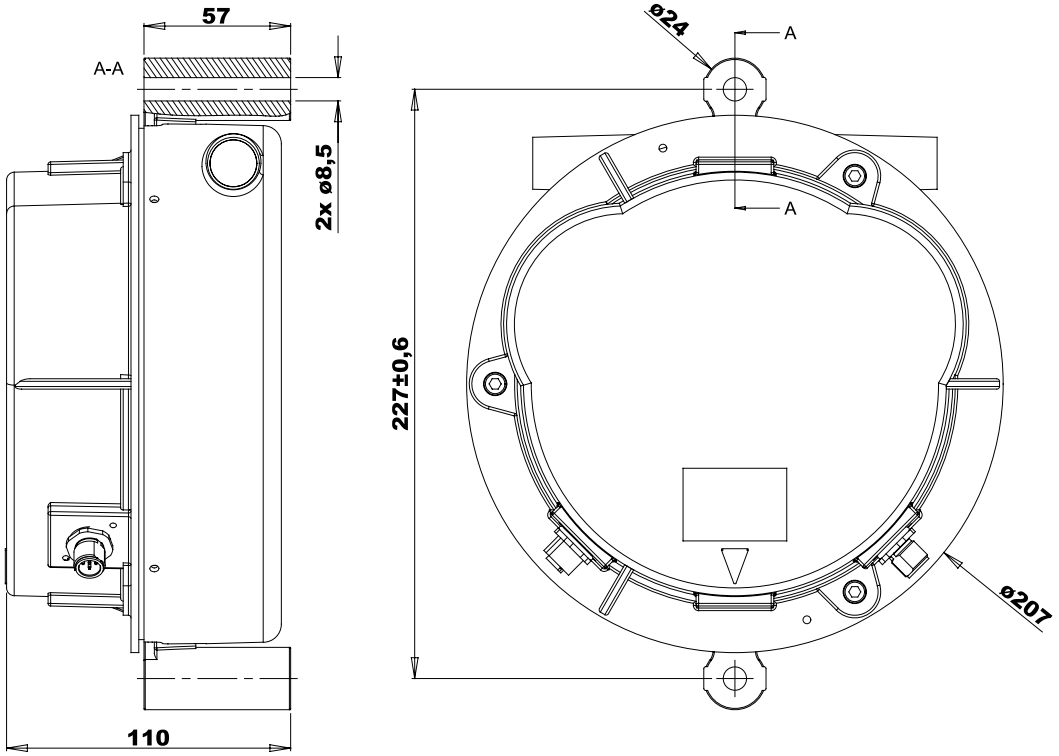
Potentiometer	
P1	Potentiometer type: 10 KΩ, 10 rounds, 1 x 10^5 cycles
P4	Potentiometer type: 10 KΩ, 10 rounds, 2.5 x 10^5 cycles

12

Casing type	
C	With a plastic casing to protect the pulley

Custom configuration are available on request

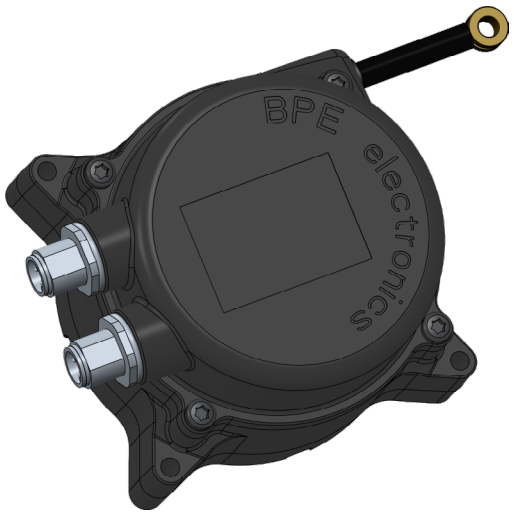
Dimensions [mm]



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
Cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
Cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
CAN Network male Termination	M12 5 pin plug connector cap with CAN network termination.

General features



- Compact angle and length transducer
- MEMS technology angular sensor
- Optimized to be used in narrow spaces
- Single channel. Possible to have it with double channel for PL d (EN13849-1) systems
- Voltage, current, ratiometric or CAN bus output
- Waterproof, plastic, compact body
- Easy to install
- PA12-coated 7x19 AISI 316 stainless steel rope
- Ninety degrees orientable electrical connection with M12x1 connectors
- Rope fixing ring for easy and quick installation

On request:

- Electrical connection with cable

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

66 mm only thickness | MEMS rensor technology | 5 m max length | 7x19 stainless steel rope | Ultra durable | Protection Grade IP66/IP67 | Wide temperature range | Can bus connection | Single or double channel

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratiometric	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption (1) [double]	10 [20] mA	30 [60] mA		30+20 [60+40] mA

(1) Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 4.0m	5 m
Length transducer (linearity, hysteresis, repetibility) accuracy	± 0.50% FS	± 0.75% FS
Length transducer resolution	0.03% FS	
Length transducer temperature drift	< 100 ppm / °C	
Angular range	from 0 to 360 degrees	
Angular transducer accuracy	± 0.5 degrees	
Angular transducer resolution	0.1 degrees	
Angular transducer temperature drift	± 0.01 degrees /°C	
Rope diameter (with coating)	0.9 (1.1) mm	
Rope breaking force	615 N	
Min/max force to pull out the rope	3.8/7.0 N	
Max wire speed	3 m/s	
Max wire acceleration	5 m/s^2	
Operating temperature	from -40 to +70 °C	
Maximum weight	0.60 kg	
Electric insulation	6500 VAC	
Housing material	PC/ABS	
Standard protection grade (electronics and spring box)	IP66/IP67	
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3	
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	
MTTFd (electronic board)	EN 13849-1: ≥ 100 years	
Maximum number of mechanical cycles	$5x10^5$	

ASu66 Series Micro angle/Length transducer

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Ring type	Output type	Electrical connection	Electrical outlet	Connector type	CAN termination	Potentiometer
ASu66	5.0	D	W	090.090	UL	3	R	99	M26	3	M12	N	P5

1

Transducer type	
ASu66	Micro angle/Length transducer

2

Length	
3.5	length = 3.5 m
4.0	length = 4.0 m
5.0	length = 5.0 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Rotation direction	
W	CW - Clockwise rotation direction (see drawing on the right for available configurations)
C	CCW - Counterclockwise rotation direction (see drawing on the right for available configurations)

5

Rotation angles		
Available angle configuration		(see drawing for available configurations)
angle 1 (AN1)	angle 2 (AN2)	
045	**135**	total range 180°
090	**090**	total range 180°
135	**135**	total range 270°
180	**180**	total range 360°

6

Rope output		
UR	Steel rope outlet on upper right side (see drawing for available configurations)	UR
UL	Steel rope outlet on upper left side (see drawing for available configurations)	UL
LR	Steel rope outlet on lower right side (see drawing for available configurations)	LR
LL	Steel rope outlet on lower left side (see drawing for available configurations)	LL

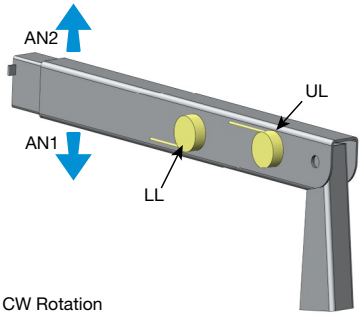
7

Steel rope	
3	AISI 316 stainless steel polyamide coated rope PA12 0.9/1.1 mm 7x19

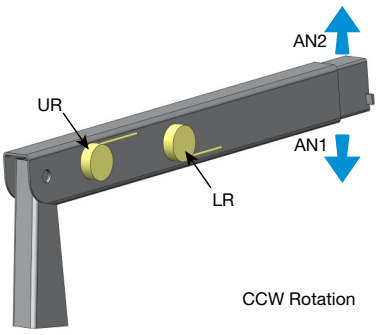
8

Ring type	
R	With metallic ring at the end of the steel rope (IN/ OUT: 5/10 mm)

Available configurations



CW Rotation



CCW Rotation

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Ring type	Output type	Electrical connection	Electrical outlet	Connector type	CAN termination	Potentiometer
ASu66	5.0	D	W	090.090	UL	3	R	99	M26	3	M12	N	P5

9 — Output type

4_	Current output: 4 to 20 mA	(single)
5_	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
55	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

10 — Electrical connection

M65	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M66	double channel		
M25	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M26	double channel		
M45	single channel	**Ratiometric output** (10% to 90%) M12 plug 1: VIN = 5 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M46	double channel		
M07	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL	 M12 plug  M12 receptable

11 — Electrical outlet

0	Electrical outlet to hours “0” or “12”
3	Electrical outlet to hours “3”
6	Electrical outlet to hours “6”
9	Electrical outlet to hours “9”

12 — Connector type

M12	Electrical connection type: M12

13 — CAN termination

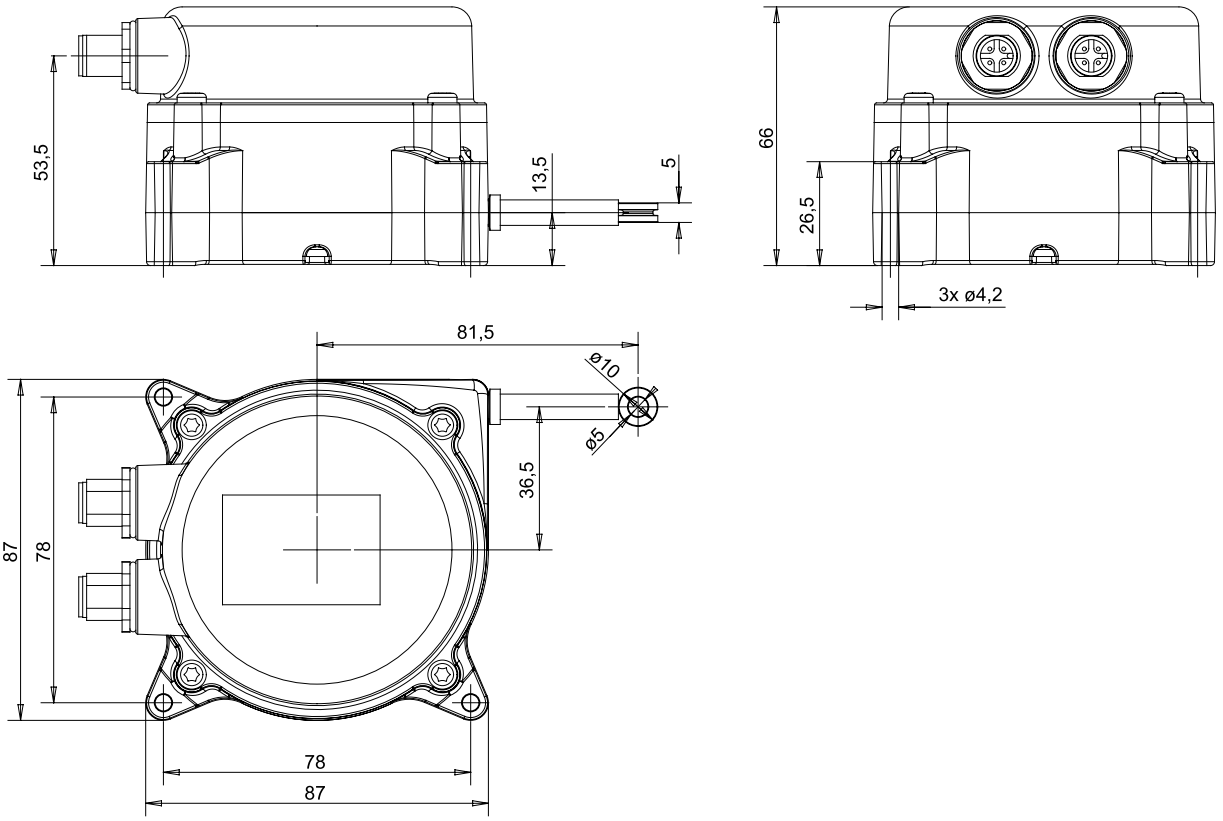
N	Without embedded CAN bus termination

14 — Ring type

P5	Potentiometer type: 10 KΩ, 1 round, 5 x 10^5 cycles

Custom configuration are available on request

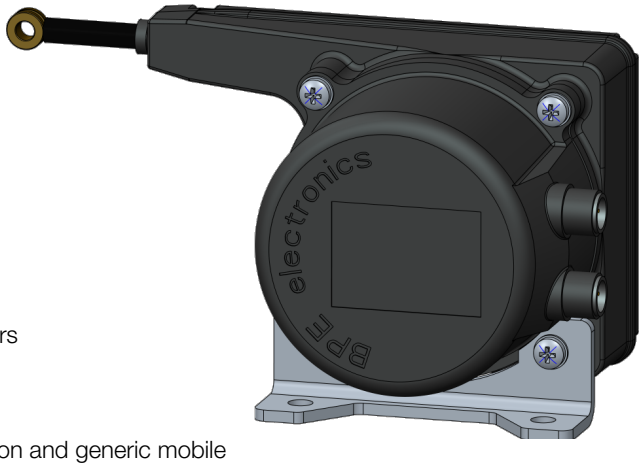
Dimensions [mm]



Accessories

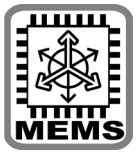
Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
Cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
Cable 10m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
CAN Network male Termination	M12 5 pin plug connector cap with CAN network termination.
Adapter	Ring to threaded rod adapter

General features



- Compact angle length transducer
- MEMS technology angular sensor
- Single channel. Possible to have it with double channel for PL d (EN13849-1) systems
- Voltage, current, ratiometric or CAN bus output
- Waterproof, plastic, compact body
- Easy to install
- PA12-coated 7x7 AISI 316 stainless steel rope
- Ninety degrees orientable fixing bracket
- Ninety degrees orientable electrical connection with M12x1 connectors
- Rope fixing ring for easy and quick installation

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.
Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



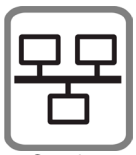
MEMS rensor technology

Full angle range

5 m max length

84.5 mm only tickness

Protection grade IP66


Can bus connection

Wide temperature range


Double crossed channel


Single or double channel

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratiometric	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption (1) [double]	10 [20] mA	30 [60] mA		30+20 [60+40] mA

(1) Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 4.0m	5.5m
Length transducer (linearity, hysteresis, repetibility) accuracy	± 0.50% FS	± 0.75% FS
Length transducer resolution	0.03% FS	
Length transducer temperature drift	< 100 ppm / °C	
Angular range	from 0 to 360 degrees	
Angular transducer accuracy	± 0.5 degrees	
Angular transducer resolution	0.1 degrees	
Angular transducer temperature drift	± 0.01 degrees /°C	
Rope diameter (with coating)	0.63 (0.80) mm	
Rope breaking force	320 N	
Min/max force to pull out the rope	3.0/6.0 N	
Max wire speed	3 m/s	
Max wire acceleration	5 m/s^2	
Operating temperature	from -40 to +70 °C	
Maximum weight	0.60 kg	
Electric insulation	6500 VAC	
Housing material	PA 6.6 + 35% glass reinforced and mineral filled	
Standard protection grade (electronics and spring box)	IP66	
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3	
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	
MTTFd (electronic board)	EN 13849-1: ≥ 100 years	
Maximum number of mechanical cycles	$1x10^5$ ($5x10^5$ on request)	

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Ring type	Output type	Electrical connection	Electrical outlet	Mounting bracket	CAN termination	Potentiometer
ASu	5.5	D	W	090.090	UL	1	R	99	M26	3	S6	N	P1

1

Transducer type	
ASu	Micro angle/Length transducer

2

Length	
2.0	length = 2.0 m
4.0	length = 4.0 m
5.5	length = 5.5 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Rotation direction	
W	CW - Clockwise rotation direction (see drawing on the right for available configurations)
C	CCW - Counterclockwise rotation direction (see drawing on the right for available configurations)

5

Rotation angles		
Available angle configuration angle 1 (AN1)	angle 2 (AN2)	(see drawing for available configurations)
045	**135**	total range 180°
090	**090**	total range 180°
135	**135**	total range 270°
180	**180**	total range 360°

6

Rope output		
UL	Steel rope outlet on upper left side (see drawing for available configurations)	UL
LR	Steel rope outlet on lower right side (see drawing for available configurations)	LR

7

Steel rope	
1	AISI 316 stainless steel polyamide coated rope PA12 0.63/0.80 mm 7x7

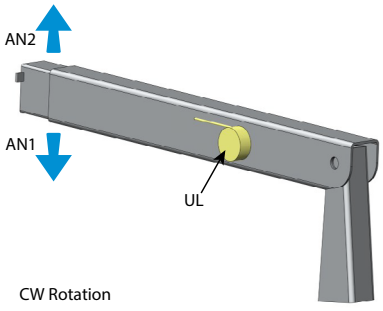
8

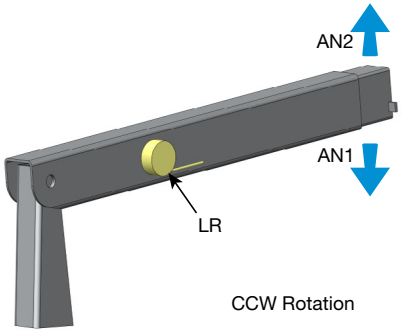
Ring type	
R	With metallic ring at the end of the steel rope (IN/ OUT: 5/10 mm)

9

Output type		
4_	Current output: 4 to 20 mA	(single)
5_	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
55	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

Available configurations





Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Ring type	Output type	Electrical connection	Electrical outlet	Mounting bracket	CAN termination	Potentiometer
ASu	5.5	D	W	090.090	UL	1	R	99	M26	3	S6	N	P1

10

Electrical connection			
M65	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M66	double channel		
M25	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M26	double channel		
M45	single channel	**Ratiometric output** (10% to 90%) M12 plug 1: VIN = 5 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M46	double channel		
M06	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL	 M12 plug

11

Electrical outlet	
0	Electrical outlet to hours “0” or “12” 
3	Electrical outlet to hours “3” 
6	Electrical outlet to hours “6” 
9	Electrical outlet to hours “9” 

12

Mounting bracket	
S0	Electrical outlet to hours “0” or “12” 
S3	Electrical outlet to hours “3” 
S6	Electrical outlet to hours “6” 
S9	Electrical outlet to hours “9” 

13

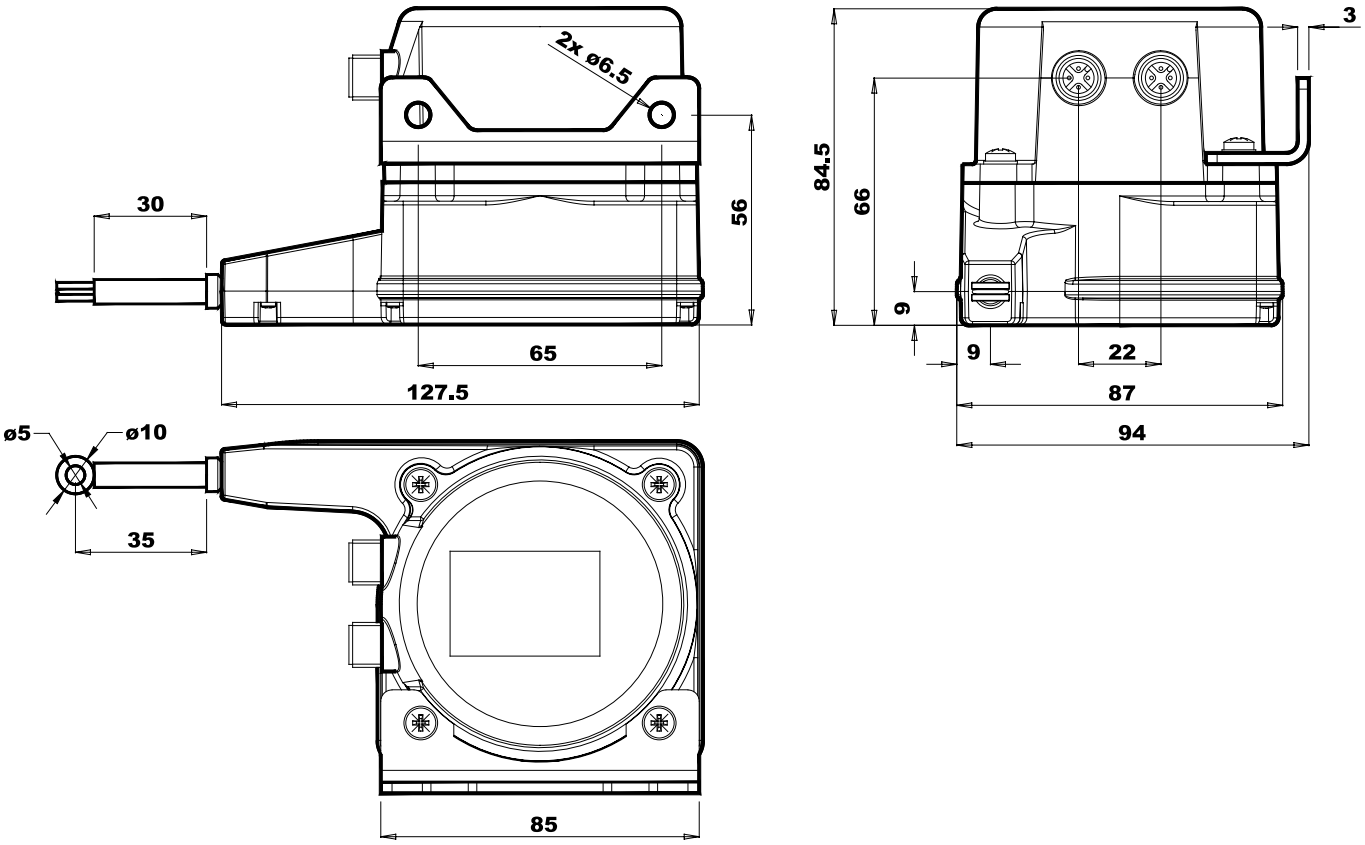
CAN termination	
N	Without embedded CAN bus termination

14

Potentiometer	
P1	Potentiometer type: 10 KΩ, 10 rounds, 1 x 10^5 cycles
P3	Potentiometer type: 10 KΩ, 5 rounds, 1 x 10^5 Cycles. For 2.0 meters only
P4	Potentiometer type: 10 KΩ, 10 rounds, 5 x 10^5 cycles

Custom configuration are available on request

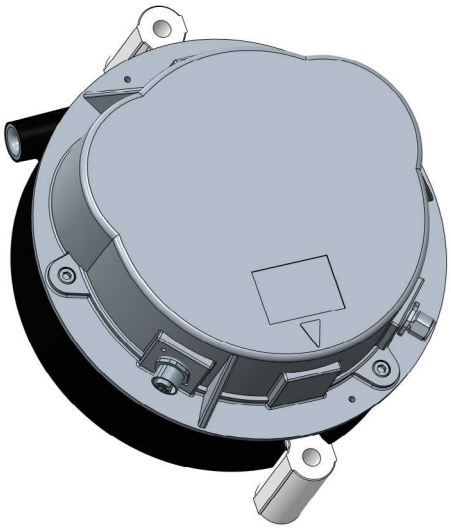
Dimensions [mm]



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Network female ermination	M12 5 pin receptacle connector cap with CAN network termination.
Adapter	Ring to threaded rod adapter

General features



- Angle and length transducer for work area management
- MEMS technology angular sensor
- Single channel. Possible to have it with double channel for PL d (EN13849-1) systems
- Voltage, current, ratiometric or CAN bus output
- Electrical connection with M12x1 connectors
- Standard length: 8.5 and 12.5 meters
- PA12-coated 7x7 AISI 316 stainless steel rope
- Waterproof, compact aluminium body
- Easy to install
- Right or left side mounting version
- Provided with a plastic casing to protect the pulley

On request:
- Special length
- Electrical connection with cable

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

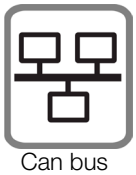
MEMS rensor technology

Full angle range

12.5 m max length


Sturdy construction

Protection Grade IP65


Can bus connection


Double crossed channel


Single or double channel

Technical Data

Power supply	5±0.2 VDC	from 9 to 33 VDC		
Outputs	10% to 90% VIN ratiometric	0.5 ÷ 4.5 VDC	CAN bus	from 4 to 20 mA
Maximum output current	10 mA	10 mA	-	-
Current consumption (1) [double]	10 [20] mA	30 [60] mA		30+20 [60+40] mA

(1) Device supply current (and max output load for 4 to 20 mA version) for single and double channel version

Measurable length	up to 12.5m
Length transducer (linearity, hysteresis, repetibility) accuracy	± 1.0% FS
Length transducer resolution	0.03% FS
Length transducer temperature drift	< 100 ppm / °C
Angular range	from 0 to 360 degrees
Angular transducer accuracy	± 0.5 degrees
Angular transducer resolution	0.1 degrees
Angular transducer temperature drift	± 0.01 degrees /°C
Rope diameter (with coating)	1.5 (2.0) mm
Rope breaking force	> 1000 N (greater than)
Min/max force to pull out the rope	9,5 N (± 40 %)
Max wire speed	3 m/s
Max wire acceleration	5 m/s^2
Operating temperature	from -25 to +70 °C
Maximum weight	2.3 kg
Housing material	aluminium body/ plastic pulley and casing
Standard protection grade (electronics and spring box)	IP65
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz
MTTFd (electronic board)	EN 13849-1: ≥ 100 years
Maximum number of mechanical cycles	$1x10^5$ ($2.5x10^5$ on request)

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Supplementary rope	Output type	Electrical connection	Electrical outlet	CAN termination	Potentiometer	Casing type
A/S	08.5	D	W	090.090	UL	5	F4	99	M26	D	N	P1	C

1

Transducer type	
A/S	Angle/Length transducer

2

Length	
08.5	length = 8.5 m
12.5	length = 12.5 m

3

Channels	
S	single channel
D	double channel
R	double channel with crossed signals

4

Rotation direction	
W	Clockwise rotation direction (see drawing for available configurations)
C	Counterclockwise rotation direction (see drawing for available configurations)

5

Rotation angles		
Available angle configuration angle 1 (AN1)	angle 2 (AN2)	(see drawing for available configurations)
090	**090**	total range 180°
135	**135**	total range 270°
180	**180**	total range 360°

6

Rope output	
UR	Steel rope outlet on upper right side (see drawing for available configurations)
UL	Steel rope outlet on upper left side (see drawing for available configurations)
LR	Steel rope outlet on lower right side (see drawing for available configurations)
LL	Steel rope outlet on lower left side (see drawing for available configurations)

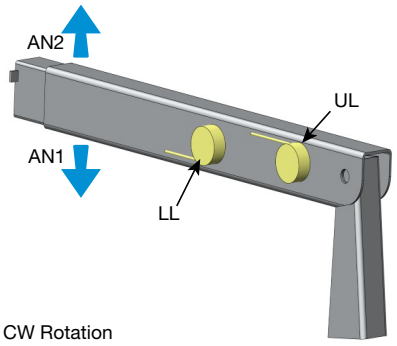
7

Steel rope	
5	AISI 316 stainless steel polyamide coated rope PA12 1.5/2.0 mm 7x7

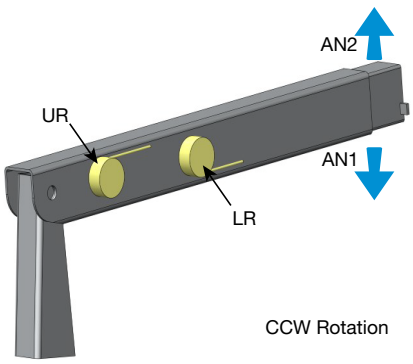
8

Supplementary rope	
F4	Supplementary steel rope length (Standard: 04 meters)

Available configurations



CW Rotation



CCW Rotation

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Transducer type	Length	Channel	Rotation direction	Rotation angles	Rope output	Steel rope	Supplementary rope	Output type	Electrical connection	Electrical outlet	CAN termination	Potentiometer	Casing type
A/S	08.5	D	W	090.090	UL	5	F4	99	M26	D	N	P1	C

9

Output type		
4_	Current output: 4 to 20 mA	(single)
5_	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
55	Ratiometric output: 10% to 90% VIN. (+5 VDC)	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

10

Electrical connection			
M65	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M66	double channel		
M25	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M26	double channel		
M45	single channel	**Ratiometric output** (10% to 90%) M12 plug 1: VIN = 5 VDC 2: Negative power supply 3: Angle signal 4: Length signal	
M46	double channel		
M07	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL	 M12 plug  M12 receptable

11

Electrical outlet	
L	Electrical connector used: left
R	Electrical connector used: right
D	Electrical connector used: both (for double transducers)

12

CAN termination	
N	Without embedded CAN bus termination

13

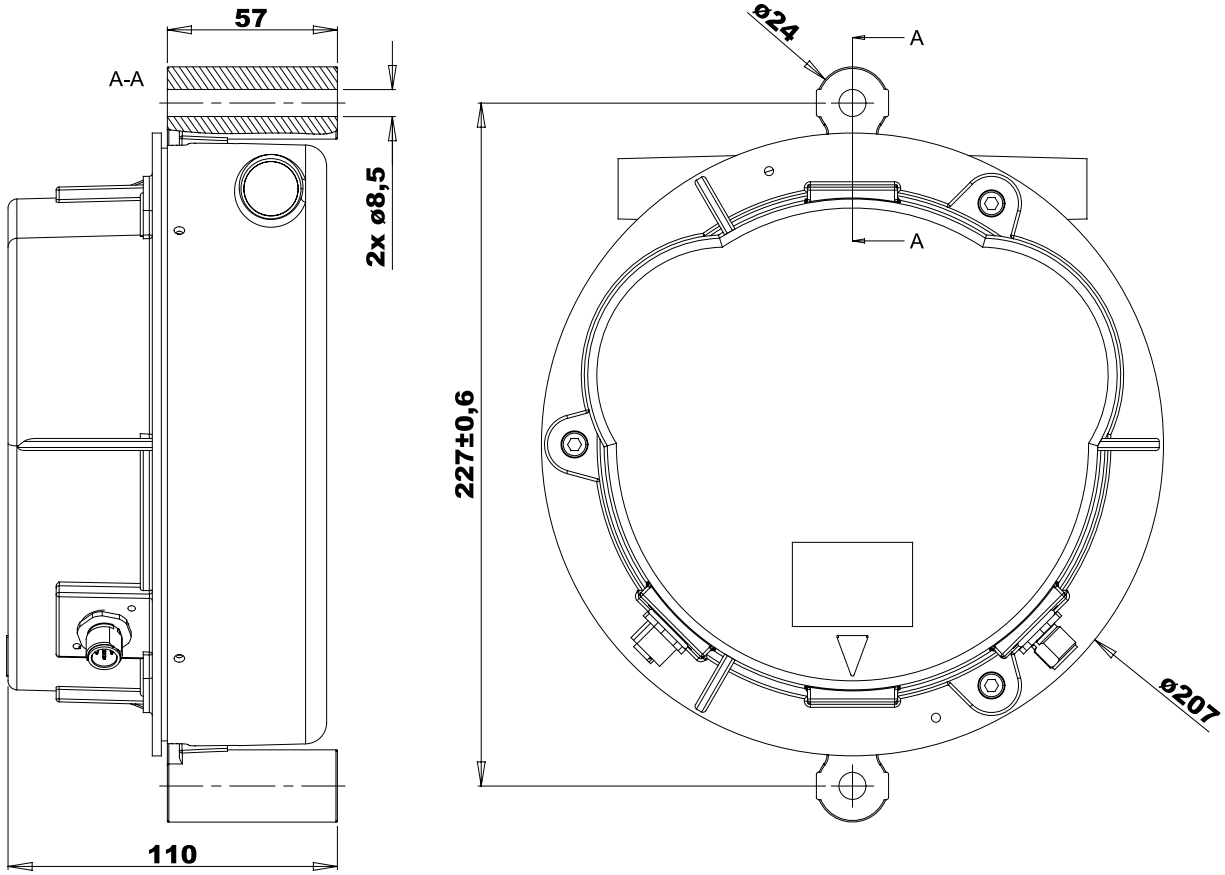
Potentiometer	
P1	Potentiometer type: 10 KΩ, 10 rounds, 1 x 10^5 cycles
P4	Potentiometer type: 10 KΩ, 10 rounds, 2.5 x 10^5 cycles

14

Casing type	
C	With a plastic casing to protect the pulley

Custom configuration are available on request

Dimensions [mm]



Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 plug connector: loose connector with 5pin, screw terminals.
Cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
Cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green), external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin plug connector.
CAN Network female Termination	M12 5 pin receptacle connector cap with CAN network termination.
CAN Network male Termination	M12 5 pin plug connector cap with CAN network termination.

General features

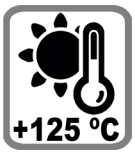
- Pressure transmitter for OEM applications
- Designed for use in heavy duty industrial environments
- 4 to 20 mA (2-wire) or 0.5 to 4.0 VDC output
- Temperature compensated
- High vibration stability
- Waterproof, plastic and stainless steel compact body
- Electrical connection with M12x1 or DT04 connector
- Process connection G ¼ A (DIN 3852-E)

Typical fields of application:
truck mounted cranes, mobile cranes, aerial platforms, industrial automation and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

Protection Grade P67

Ultra durable



Up to + 125° C

Technical Data

Power supply (VIN)	10 to 36 VDC	5V ± 0.5 VDC
Output signal	4 to 20 mA	10 to 80% ratiometric
Accuracy, hysteresis and repeatability	< ±0.5 (BFSL), < ±1 %FS	
Operating temperature	from –40 to +125 °C	
Compensated temperature range	0 to +80 °C	
Thermal zero point shift	≤± 0.15 %FS/10K (1)	
Thermal sensitivity (span) shift	≤± 0.15 %FS/10K (1)	
Standard protection grade	IP67	
Maximum weight	70 g	
Construction material: wetted parts | case	Stainless steel | highly resistive, fiberglass-enforced plastic (PBT)	
Max driving torque	30 Nm	
CE conformity	EMC Directive: 2014/30/EU PED Directive: 97/23/EC	
EMC: Immunity | Emission	EN 61326-1 | EN 61326-2-3	
Vibration resistance: Sinus	EN 60068-2-6: 20 g	
Shock resistance: Shock	EN 60068-2-27: 500 g	
MTTFd (electronic board)	≥ 100 years	
Maximum number of mechanical cycles	$8x10^6$	

(1) Inside compensated temperature range

Ordering Code

1	2	3	4	5	6	7	8	9
Transducer type	Electrical output	Channel	Series	Pressure range	Process connection	Ouput connecion	Reserved	Custom configuration
TP	V	S	K1	250	G1A	M4P	N	NOT

1

Transducer type	
TP	Pressure trasmitter

2

Electrical output	
A	Current output: 4 to 20 mA (2 wire)
V	Voltage output: 0.5 ÷ 4.0 VDC (ratiometric, 3 wire)

3

Channel	
S	Single channel

4

Series	
K1	K1 series

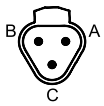
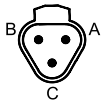
5

Pressure range	
250	0 ÷ 250 bar
400	0 ÷ 400 bar

6

Process connection	
G1A	G 1/4 A (DIN 3852-E)

7

Output connection		
M6F	**Current output** (4 to 20 mA) M12 plug 1: + VIN 2: Not used 3: - VIN (output) 4: Not used	
M4P	**Voltage output** (0.5 to 4.0 VDC) M12 plug 1: VIN = 4.5 to 5.5 VDC 2: Output 3: 0 VDC 4: Not used	
D6F	**Current output** (4 to 20 mA) DT04-3P A: + VIN B: -VIN (output) C: Not used	
D4P	**Voltage output** (0.5 to 4.0 VDC) DT04-3P A: VIN = 4.5 to 5.5 VDC B: 0 VDC C: Output	

8

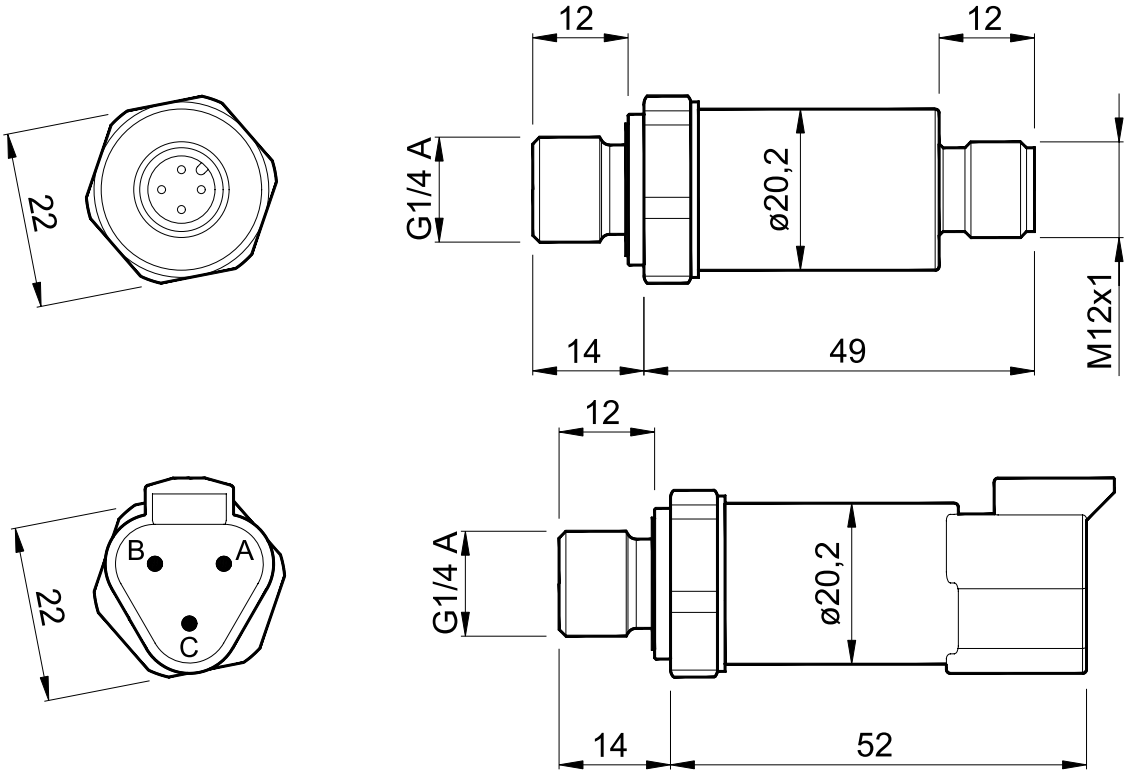
Reserved	
N	Standard

9

Custom configuration	
NOT	Standard

Custom configuration are available on request

Dimensions [mm]



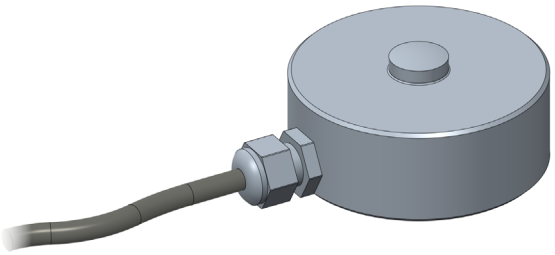
Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 15m female / Stripped wires	Length 15m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Counterpart Connector	Cable mount Deutsch DT06-3S plug connector with 3 female terminals (code 0462-201-16141) and wedge-lock (code W3S).
Cable 5m male / Stripped wires	Length 5m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. DEUTSCH DT06-3S plug connector with 3 female terminals.
Cable 10m male / Stripped wires	Length 10m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. DEUTSCH DT06-3S plug connector with 3 female terminals.
Cable 15m male / Stripped wires	Length 15m, multipolar cable for dynamic installations, 3 conductors (brown, blue, yellow/green) sections 0.5mm², external black jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. DEUTSCH DT06-3S plug connector with 3 female terminals.

TC35 Series Compression load cell

General features

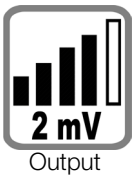
- Outer diameter 35 mm
- Made of stainless steel
- Single channel version with 4xAWG24 3.0 m shielded cable
- Double channel version, suitable for PL d (EN13849-1) systems, with 8xAWG24 1.5 m cable on M12 connector



On request:
- Special finishes and materials
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series

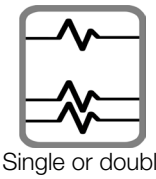
Typical fields of application:
Normally used to measure the load or the compression forces in mobile machines or generic industrial applications.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application.



Output sensitivity

Protection Grade IP67


Single or double channel

Technical Data

Power supply	from 0 to 15 VDC
Output	2.0 mV/V
Nominal load	1500 / 2500 / 5000 daN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008 [1] %FS / °C
Insulation	> 5 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	300%
Operating temperature	from -20 to +70°C
Maximum weight	0.3 kg
Housing material	stainless steel
Standard protection grade	IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

[1] Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9
Transducer type	Nominal load	Channel	Height	Housing material	Cable gland	Cable length	Custom configuration	Electrical connection
TC35	02500	S	H16	2	1M6_	L03000	NOT	CCF

1

Transducer type	
TC35	Compression load cell

2

Nominal load	
01500	1500 daN
02500	2500 daN
05000	5000 daN

3

Channel	
S	single channel
D	double channel

4

Height	
H16	16.0 mm

5

Housing material	
2	Stainless steel

6

Cable gland	
1M6_	With M6 cable gland (single channel version)
NOT_	Without cable gland (double channel version)

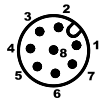
7

Cable length	
L01500	Double channel: 1.5 m cable length (M12 connector)
L03000	Single channel: 3.0 m cable length

8

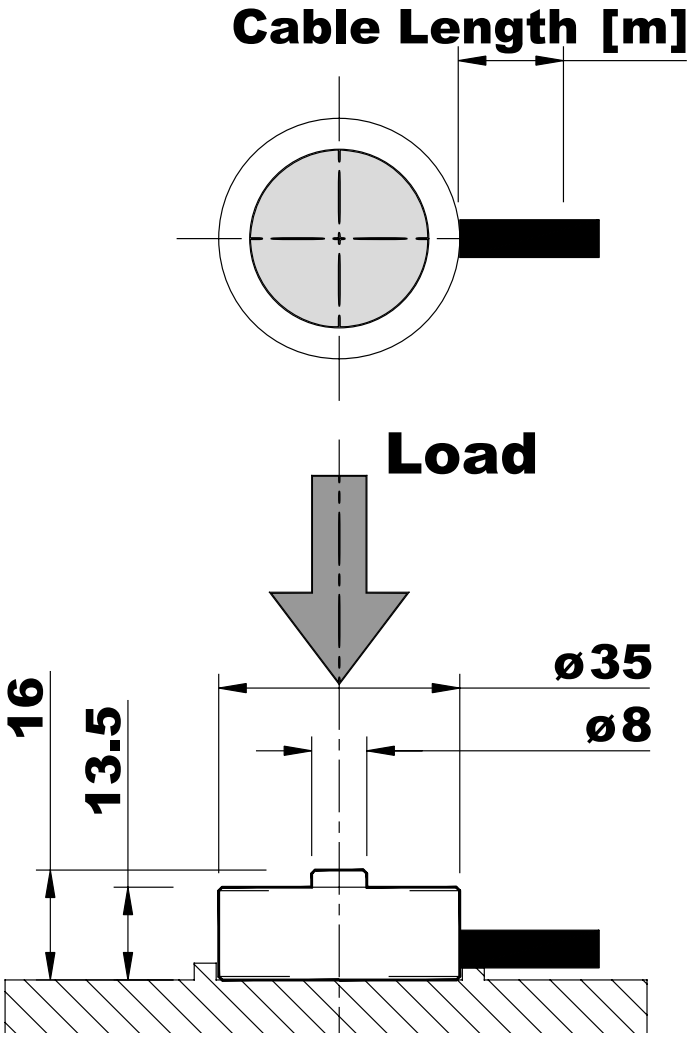
Custom configuration	
NOT	Not amplified signal

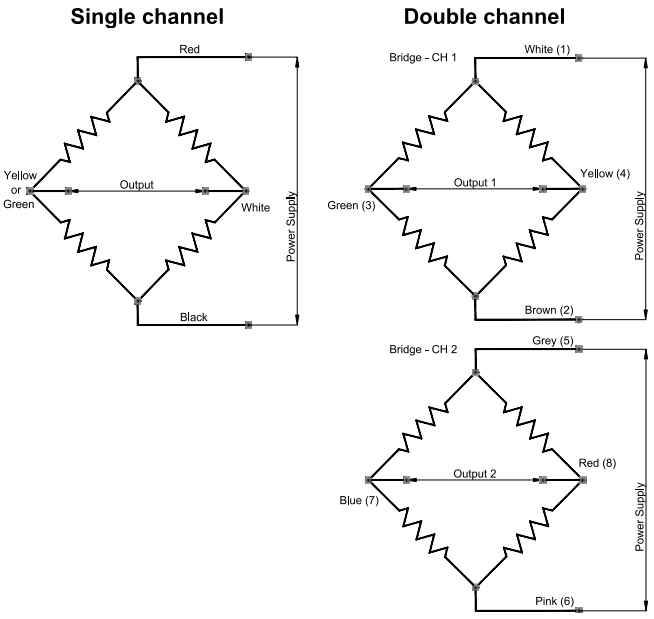
9

Electrical connection			
CCF	single channel	Red: Positive supply Black: Negative supply Yellow or Green : Signal - White: Signal + Shield: Not connected	
MC0	double channel	1: Positive Supply 1 2: Negative Supply 1 3: Signal 1+ 4: Signal 1- 5: Positive Supply 2 6: Negative Supply 2 7: Signal 2+ 8: Signal 2-	M12 PLUG 

Custom configuration are available on request

Dimensions [mm]





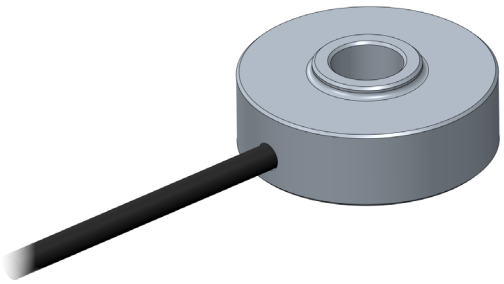
Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 8pin, screw terminals.

General features

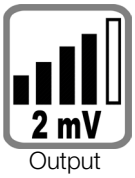
- Outer diameter 45 mm
- Made of stainless steel
- Single channel version with 4xAWG24 1.5 m shielded cable

On request:
- Special finishes and materials
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series



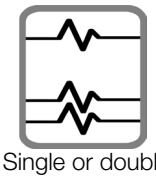
Typical fields of application:
Normally used to measure the load or the compression forces in mobile machines or generic industrial applications.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



Output sensitivity

Protection Grade IP67


Single or double channel

Technical Data

Power supply	from 0 to 15 VDC
Output	2.0 mV/V
Nominal load	2750 / 6000 daN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008 [1] %FS / °C
Insulation	> 5 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	300%
Operating temperature	from -20 to +70°C
Maximum weight	0.2 kg
Housing material	stainless steel
Standard protection grade	IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

[1] Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9
Transducer type	Nominal load	Channel	Height	Housing material	Cable gland	Cable length	Custom configuration	Electrical connection
TC45	02750	S	H16	2	NOT_	L01500	NOT	CCF

1

Transducer type	
TC45	Compression load cell

2

Nominal load	
02750	2750 daN
06000	6000 daN

3

Channel	
S	single channel
D	double channel

4

Height	
H16	16.0 mm

5

Housing material	
2	Stainless steel

6

Cable gland	
NOT_	Without cable gland (double channel version)

7

Cable length	
L01500	Double channel: 1.5 m cable length (M12 connector)

8

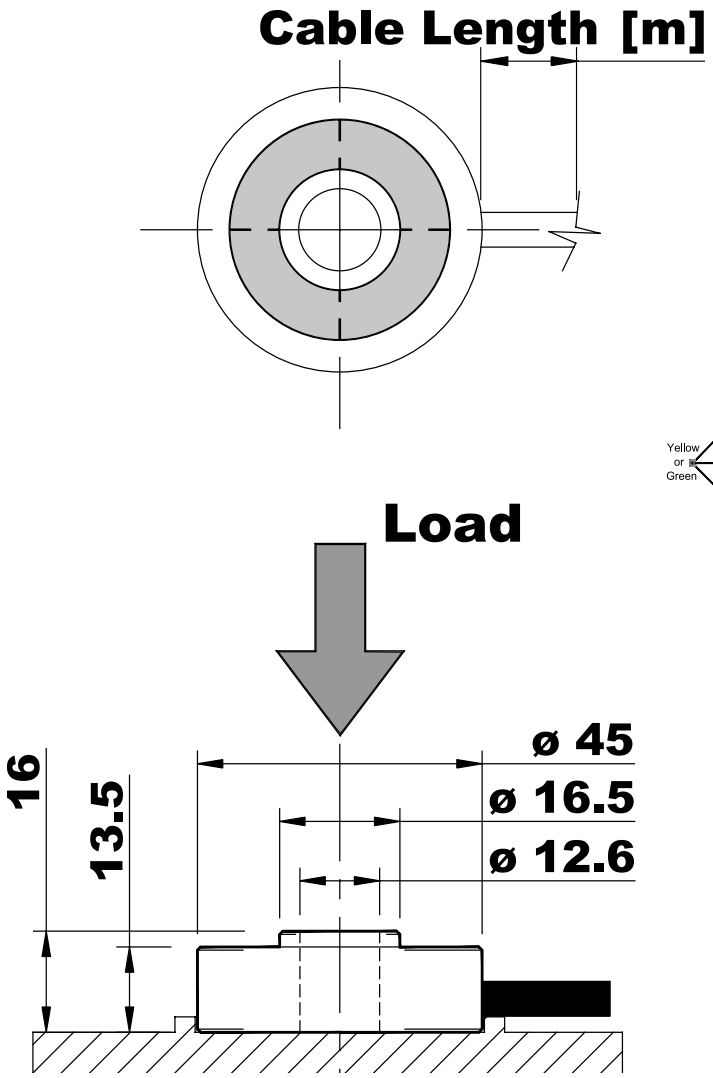
Custom configuration	
NOT	Not amplified signal

9

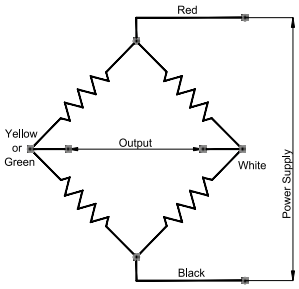
Electrical connection			
CCF	single channel	Red: Black: Yellow or Green : White: Shield:	Positive supply Negative supply Signal - Signal + Not connected

Custom configuration are available on request

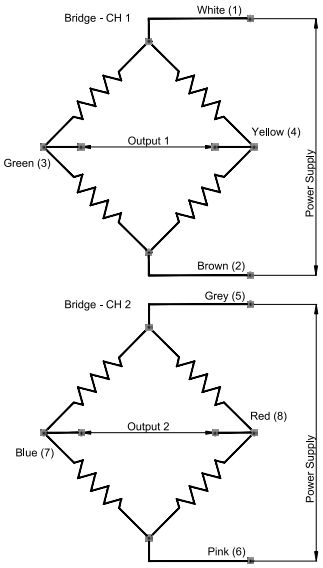
Dimensions [mm]



Single channel

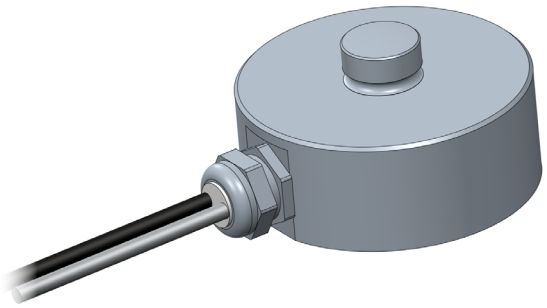


Double channel



TC82 Series Compression load cell

General features



- Outer diameter 82 mm
- Made of stainless steel
- Double channel version suitable for PL d (EN13849-1) systems
- Electrical connection with 4xAWG24 5.0 m shielded cable

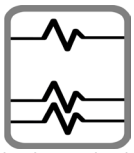
On request:
- Special finishes and materials
- Load cell amplifier

Typical fields of application:
Normally used to measure the load in an aerial basket/work platform cages and generic mobile machines

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

Output sensitivity

Protection Grade IP66/IP67


Single or double channel

Technical Data

Power supply	from 0 to 15 VDC
Output	2.0 mV/V
Nominal load	1000 / 2500 / 5000 DaN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008 [1] %FS / °C
Insulation	>2 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	300%
Operating temperature	from -20 to +70°C
Maximum weight	1.25 Kg
Housing material	Stainless steel
Standard protection grade	IP66 / IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

[1] Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9
Transducer type	Nominal load	Channel	Height	Housing material	Cable gland	Cable length	Custom configuration	Electrical connection
TC82	01000	S	H44	2	1P11	L05000	NOT	CCF

1

Transducer type	
TC82	Compression load cell

2

Nominal load	
01000	1000 daN
02500	2500 daN
05000	5000 daN

3

Channel	
S	single channel
D	double channel

4

Height	
H44	44.0 mm

5

Housing material	
2	Stainless steel

6

Cable gland	
1P11	With PG11 cable gland

7

Cable length	
L05000	5.0 m cable length

8

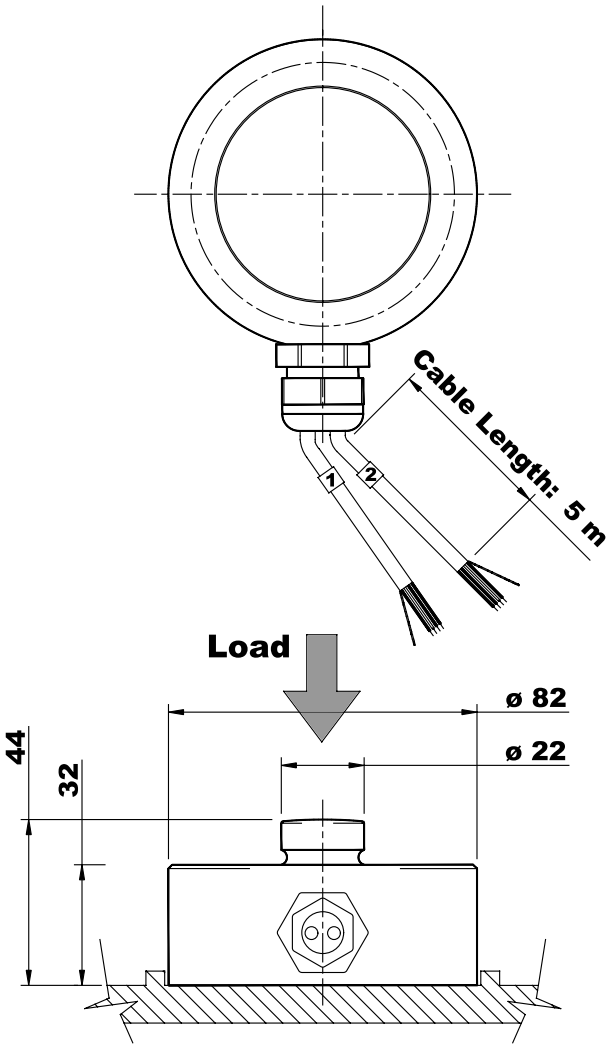
Custom configuration	
NOT	Not amplified signal

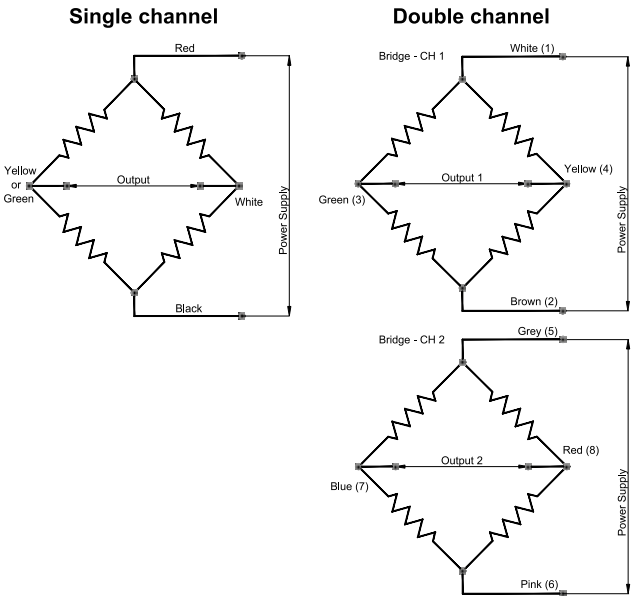
9

Electrical connection		
CCF	single or double channel	Red: Positive supply Black: Negative supply Yellow or Green : Signal - White: Signal + Shield: Not connected

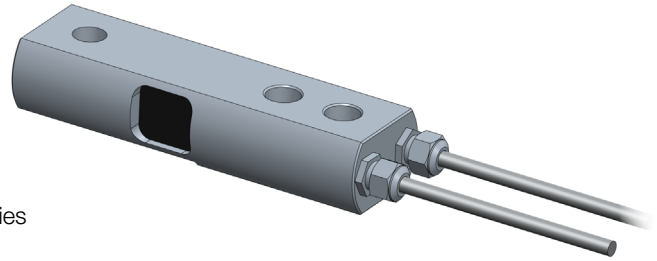
Custom configuration are available on request

Dimensions [mm]





General features



- Made of alloy structural steel
- Electrical connection with 4m shielded cable (4xAWG24)
- Double channel version suitable for PL d (EN13849-1) systems

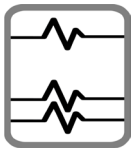
On request:
- Special finishes and materials
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series

Typical fields of application:
Normally used to measure the load in an aerial basket/work platform cages and generic mobile machines

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

Output Sensitivity

Protection Grade IP67


Single or double channel

Technical Data

Power supply	from 0 to 15 VDC		
Output	2.0 mV/V	1.0 mV/V	1.7 mV/V
Nominal load	350 daN	1000 daN	5000 daN
Linearity, repeatability, hysteresis	± 1%FS		
Zero offset	± 1%FS		
FS and zero temperature coefficient	0.008 (1) %FS / °C		
Insulation	> 5 GΩ @15VDC		
Input and output resistance	350 Ω		
Safe overload	150%		
Ultimate load	300%		
Operating temperature	from -20 to +70 °C		
Mounting bolt tightening torque (screws class 10.9)	65 Nm	65 Nm	280 Nm
Maximum weight	0.85 kg	0.9 kg	1.3 kg
Housing material	Alloy structural steel		
Standard protection grade	IP67		
CE conformity	EMC Directive 2014 / 30 / UE		
EMC: Immunity | Emission	EN 61000-6-2 | EN61000-6-3		
Maximum number of mechanical cycles	$1x10^6$ cycles		

1) Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9	10
Transducer type	Nominal load	Channel	Outer diameter	Height	Length	Housing material	Cable length	Custom configuration	Electrical connection
TT	01000	S	35	23	115	1	L04000	NOT	CCF

1

Transducer type	
TT	Shear load cell

2

Nominal load	
00350	350 daN
01000	2500 daN
05000	5000 daN

3

Channel	
S	single channel
D	double channel

4

Outer diameter	
35	35 mm (for 350 daN and 1000 daN)
38	38 mm (for 5000 daN)

5

Height	
23	23 mm (for 350 daN and 1000 daN)
32	32 mm (for 5000 daN)

6

Length	
115	115 mm

7

Housing material	
1	Alloy structural steel

8

Cable length	
L04000	4.0 m standard cable length

9

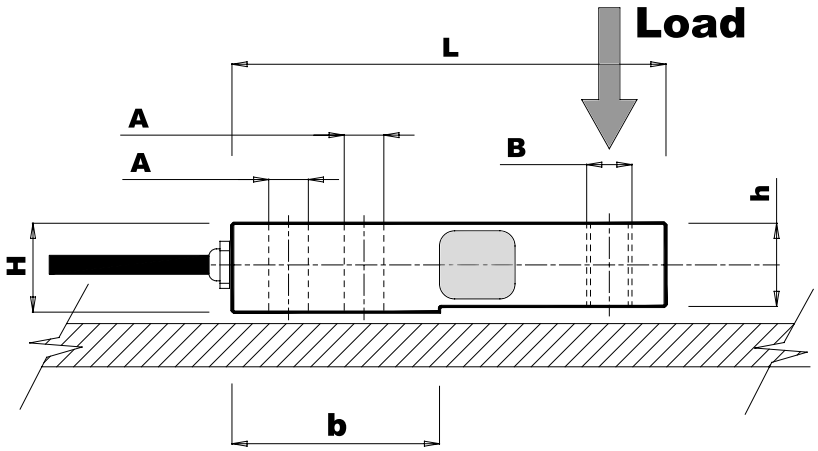
Custom configuration	
NOT	Not amplified signal

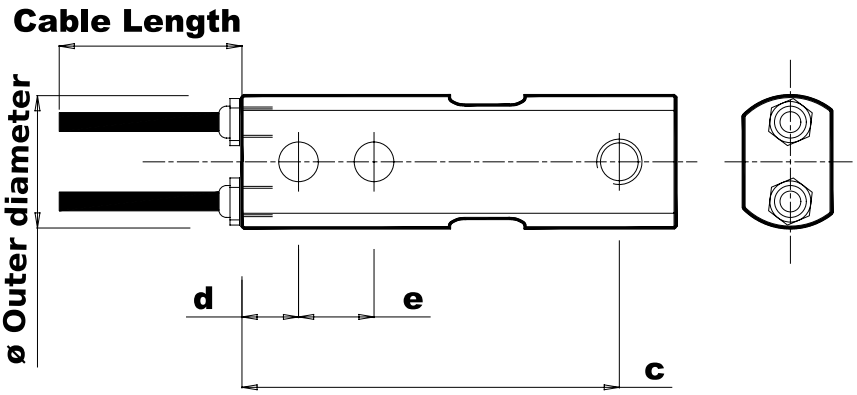
10

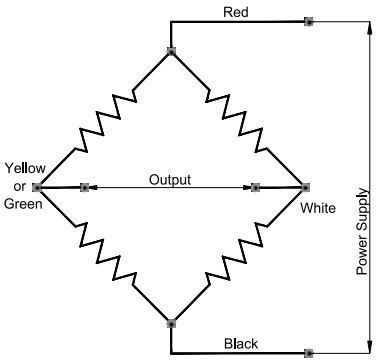
Electrical connection		
CCF	single or double channel	Red: Positive supply Black: Negative supply Yellow or Green : Signal - White: Signal + Shield: Not connected

Custom configuration are available on request

Dimensions [mm]

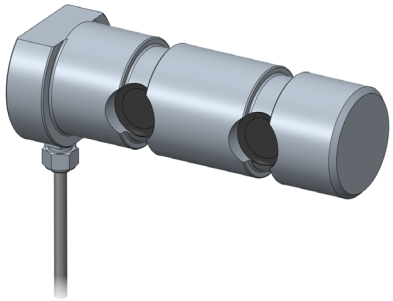






Load	Ø Outer diameter	L	b	c	d	e	h	H	Cable lenght	A	B
350	35	115	55	100	15	20	22	23.5	4000	Ø 10.5	M12
1000	35	115	55	100	15	20	22	23.5	4000	Ø 10.5	M12
5000	38	115	58	95.5	16	25.4	30	32	4000	Ø 16.5	Ø 20.5

General features

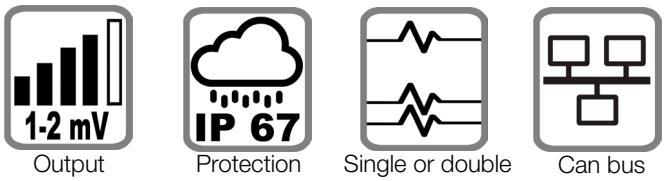


- Made of alloy structural steel or stainless steel
- Double channel version suitable for PL d (EN13849-1) systems
- Electrical connection with 4xAWG24 4.0 m shielded cable or M12x1 connector (L=700 mm)
- Customizable nominal load and physical dimensions
- It is possible to have an internal amplifier if the load cell can contain it

On request:
- Special finishes and materials
- Load cell amplifier

Typical fields of application:
Normally used to measure the load in mobile machines or on rotating components (pulley, sheaves, etc.)

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



Output Sensitivity | Protection Grade IP67 | Single or double channel | Can bus connection

Technical Data

	Not amplified signal	Amplified signal
Power supply	from 0 to 15 VDC	9 to 33 VDC [1]
Output	1.0 ÷ 2.0 mV/V	one 4 to 20 mA or 0.5 to 4.5 VDC or CAN bus
Nominal load	from 500 to 200,000 daN	
Linearity, repeatability, hysteresis	± 1% FS	
Zero offset	± 1% FS	
FS and zero temperature coefficient	0.008 [2] %FS / °C	
Insulation	> 5 GΩ @15 VDC	
Input and output resistance	350 Ω	
Safe overload	150%	
Ultimate load	300%	
Operating temperature	from -20 to +70 °C	
Housing material	alloy structural steel or stainless steel	
Standard protection grade	IP67	
CE conformity	EMC Directive: 2014/30/EU	
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3	
Maximum number of mechanical cycles	$1x10^6$ cycles	
MTTFd (electronic board)	Without electronic parts	EN 13849-1: ≥ 100 years

[1] Protected against polarity inversion
[2] Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9	10
Transducer type	Nominal load	Channel	Outer diameter	Pin length	Housing material	Cable length	Electrical outlet	Output type	Electrical connection
TPE	01000	S	32.h7	23	1	1	CR	NO	CCF

1

Transducer type	
TPE	Pin load cell

2

Nominal load	
0xxxxx	xxxxx daN (customer request)

3

Channel	
S	single channel
D	double channel

4

Outer diameter	
xxx.x	xxx mm (customer request, madatory to define tolerances)

5

Pin length		
L	**xxx.x**	See dimensions in page 59. xxx mm (customer request, define tolerances where necessary)

6

Housing material	
1	Alloy structural steel
2	Stainless steel (if possible: function of dimensions, load, etc.)

7

Cable length	
4000	4000 mm (standard with amplifier)
700	700 mm (standard without amplifier)
xxxx	xxxx mm (customer request)

8

Electrical outlet	
CA	Axial outlet (see drawing in page 59)
CR	Radial outlet (see drawing in page 59)

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10
Transducer type	Nominal load	Channel	Outer diameter	Pin length	Housing material	Cable length	Electrical outlet	Output type	Electrical connection
TPE	01000	S	32.h7	23	1	1	CR	NO	CCF

9

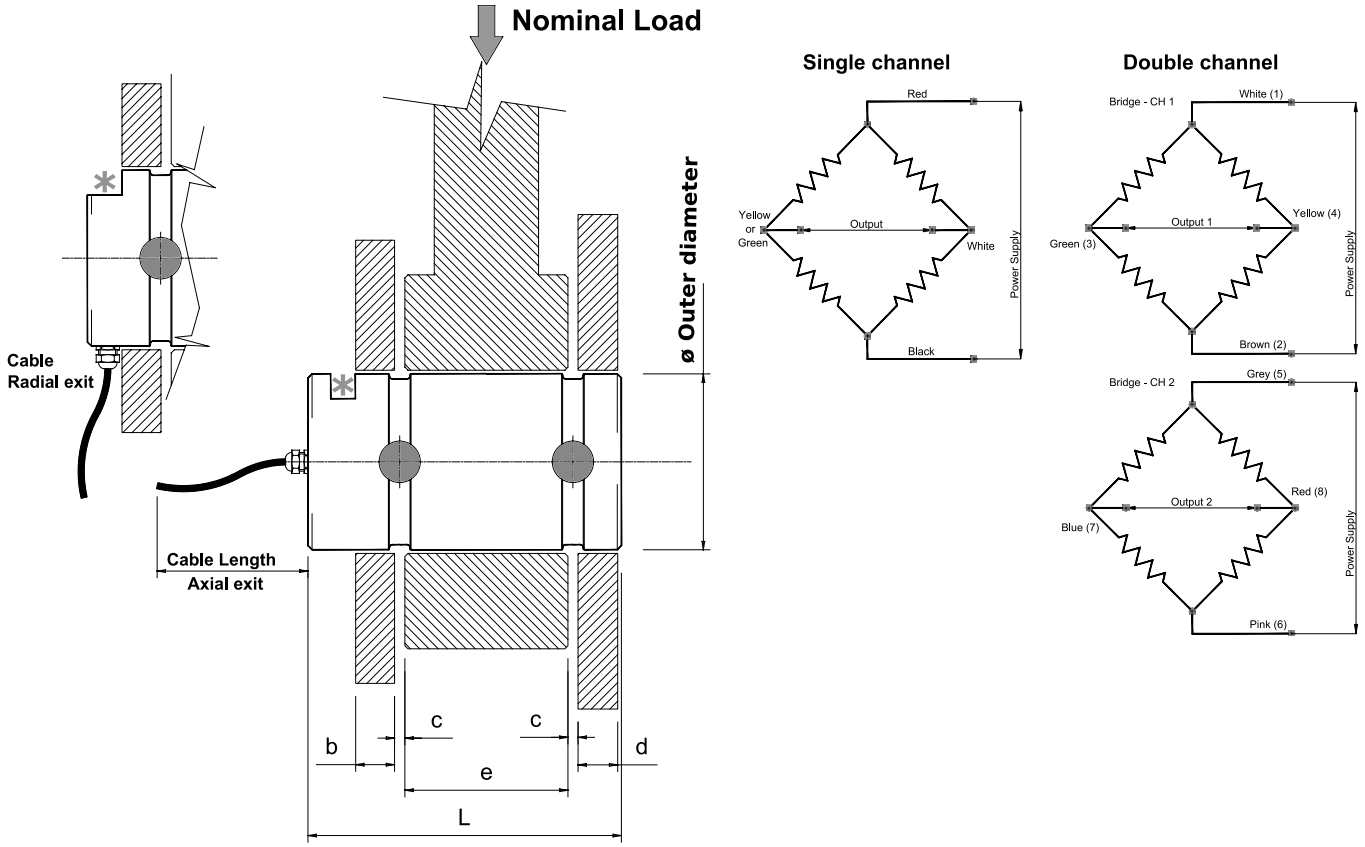
Output type		
NO	Not amplified signal	
4_	Current output: 4 to 20 mA	(single)
7_	CAN output: CAN bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
77	CAN output: CAN bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

10

Electrical connection		
CCF	single or double channel	Red: Positive supply Black: Negative supply Yellow or Green : Signal - White: Signal + Shield: Not connected
M75	single channel	1: VIN = 9 to 33 VDC 2: Signal 1 3: Negative power supply 4: Signal 2 (M7A only)
M7A	double channel	
M30	single channel	1: VIN = 9 to 33 VDC 2: Signal 1 3: Negative power supply 4: Signal 2 (M3A only)
M3A	double channel	
M05	single or double channel	1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL

Custom configuration are available on request

Dimensions [mm]



For dimensions, ask to Dana Sales.

Define anti-rotation lock (*): type and position for pin lock system, must be defined before the order.

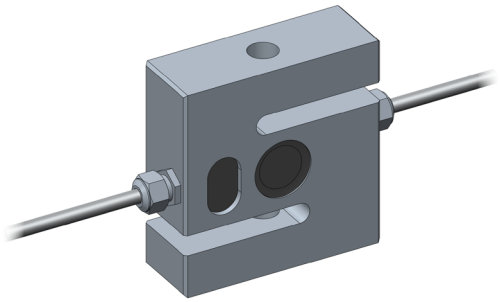
Accessories

Type	Description
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.

TR1 Series Tension load cell

General features

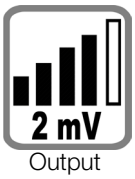
- Made of stainless steel
- Double channel version suitable for PL d (EN13849-1) systems
- Electrical connection with two 6xAWG24 5.0 m shielded cables



On request:
- Special finishes and materials
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series

Typical fields of application:
Normally used to measure the load in an aerial basket/work platform cages and generic mobile machines

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



Output sensitivity

Protection Grade IP67


Double channel

Technical Data

Power supply	from 0 to 15 VDC
Output	2.0 mV/V
Nominal load	2500 daN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008 (1) %FS / °C
Insulation	> 5 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	300%
Operating temperature	from -20 to +70 °C
Maximum weight	1.2 kg
Housing material	stainless steel
Standard protection grade	IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

(1) Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9	10
Transducer type	Nominal load	Channel	Fixing holes	Size	Housing material	Cable gland	Cable length	Custom configuration	Electrical connection
TR1	02500	D	M12	S1	2	2M8_	L05000	NOT	CCA

1

Transducer type	
TR1	Tension load cell

2

Nominal load	
02500	2500 daN

3

Channel	
D	double channel

4

Fixing holes	
M12	fixing holes with M12 thread

5

Size	
S1	Standard size

6

Housing material	
2	Stainless steel

7

Cable gland	
2M8_	With two M8 cable gland

8

Cable length	
L05000	5.0 m standard cable length

9

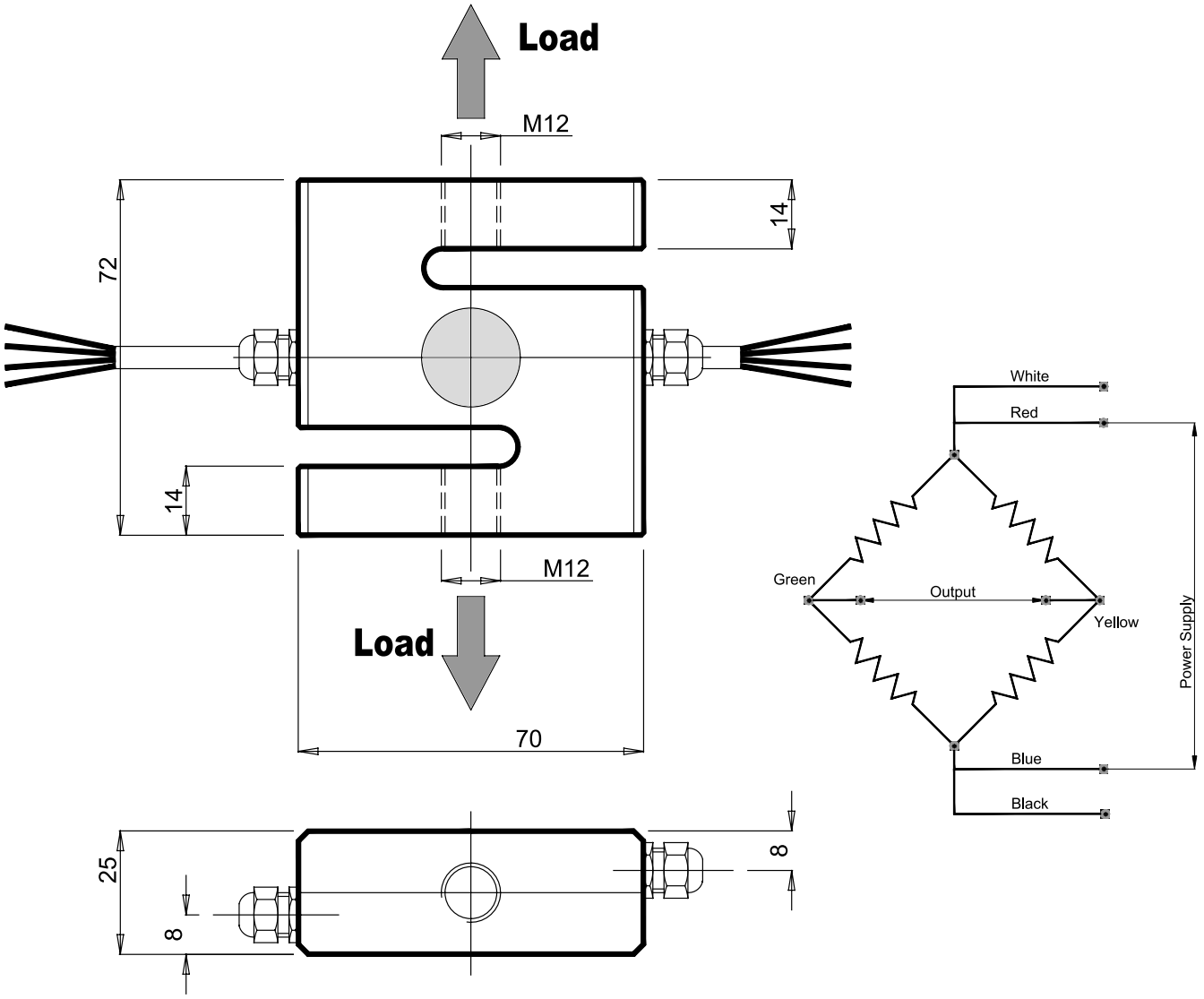
Custom configuration	
NOT	Not amplified signal

10

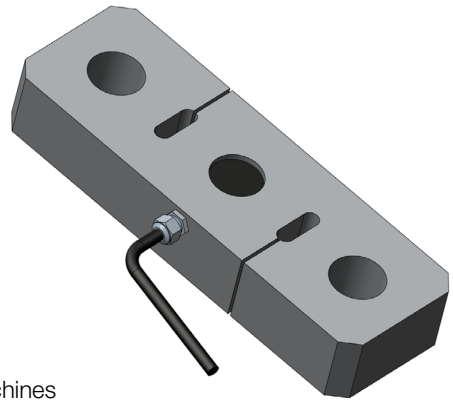
Electrical connection			
CCA	double channel	Red: Blue: Green : Yellow: Black: White: Shield:	Positive supply Negative supply Signal - Signal + Sense - Sense + Not connected

Custom configuration are available on request

Dimensions [mm]



General features



- Made of stainless steel
- Electrical connection with 5.0 m shielded cable 4xAWG24 for single channel transducer

On request:
- Double channel version suitable for PL d (EN13849-1) systems
- Special finishes and materials
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series

Typical fields of application:
Normally used to measure suspended loads, rope loads or loads in generic mobile machines

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

Output Sensitivity

Protection Grade IP67


Single channel

Technical Data

Power supply	from 0 to 15 VDC
Output	1.0 mV/V
Nominal load	from 6500 daN to 12000 daN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008 (1) %FS / °C
Insulation	> 5 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	500%
Operating temperature	from -20 to +70 °C
Maximum weight	from 4.5 kg to 11.5 kg
Housing material	stainless steel
Standard protection grade	IP67
CE conformity	EMC Directive: 2014/30/EU
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

(1) Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9	10
Transducer type	Nominal load	Channel	Fixing holes	Width	Housing material	Cable gland	Cable length	Custom configuration	Electrical connection
TR2	06500	S	F26	34	2	1M8_	L05000	NOT	CCF

1

Transducer type	
TR2	Tension load cell

2

Nominal load	
06500	6500 daN
12000	12000 daN

3

Channel	
S	single channel

4

Fixing holes	
F26	Fixing holes diameters 26 mm (6500 daN nominal load)
F36	Fixing holes diameters 36 mm (12000 daN nominal load)

5

Width	
34	34 mm (6500 daN nominal load)
50	50 mm (12000 daN nominal load)

6

Housing material	
2	Stainless steel

7

Cable gland	
1M8_	With one M8 cable gland

8

Cable length	
L05000	5.0 m standard cable length

9

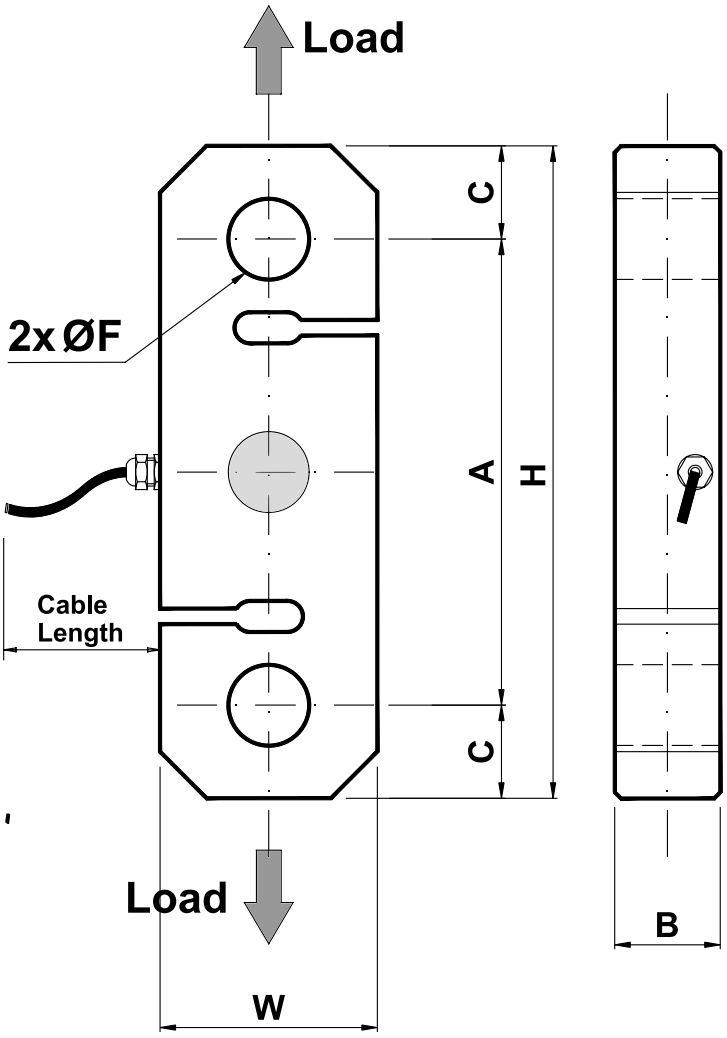
Custom configuration	
NOT	Not amplified signal

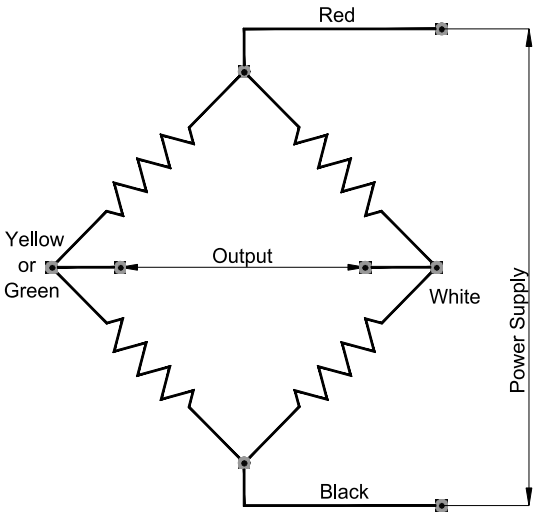
10

Electrical connection		
CCF	single or double channel	Red: Positive supply Black: Negative supply Yellow or Green : Signal - White: Signal + Shield: Not connected

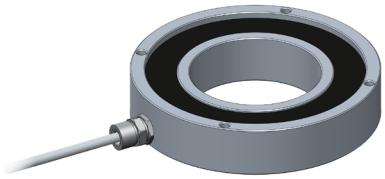
Custom configuration are available on request

Dimensions [mm]





General features

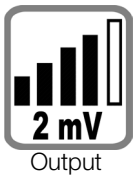


- Made of stainless steel
- Single or double channel version
- Electrical connection with 5 m shielded cable: 4xAWG24 for the single channel and 6xAWG26 for double channel

On request:
- Load cell amplifier (to be ordered separately): BPE «ADS-200 MkII» series

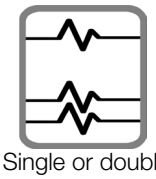
Typical fields of application:
Normally used to measure the load in aerial basket/work platform cages and generic mobile machines

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



Output sensitivity

Protection Grade IP67


Single or double channel

Technical Data

Power supply	from 0 to 15 VDC
Output	2.0 mV/V
Nominal load	1000 daN
Linearity, repeatability, hysteresis	± 1% FS
Zero offset	± 1% FS
FS and zero temperature coefficient	0.008(1) %FS / °C
Insulation	> 5 GΩ @ 15 VDC
Input and output resistance	350 Ω
Safe overload	150%
Ultimate load	300%
Operating temperature	from -20 to +70 °C
Maximum weight	0.9 kg
Housing material	Stainless steel
Standard protection grade	IP67
CE conformity	EMC Directive: 2014/30/UE
EMC: Immunity | Emission	EN 61000-6-2 | EN 61000-6-3
Maximum number of mechanical cycles	$1x10^6$ cycles

(1) Between -10°C and + 40°C

Ordering Code

1	2	3	4	5	6	7	8	9	10	11	12
Transducer type	Nominal load	Channel	Outer diameter	Inner diameter	Height	Holes	Housing material	Cable gland	Cable lenght	Custom configuration	Electrical connection
TAN	01000	D	118	62	25	4D04	2	1M8_	L05000	NOT	CC5

1 — Transducer type

TAN	Ring load cell

2 — Nominal load

01000	1000 daN

3 — Channel

S	single channel
D	double channel

4 — Outer diameter

118	118 mm (see dimension drawing in page 68)

5 — Inner diameter

62	62 mm (see dimension drawing in page 68)

6 — Height

25	25 mm (see dimension drawing in page 68)

7 — Holes

4D04	Four 4.5 mm holes

8 — Housing material

2	Stainless steel

9 — Cable gland

1M8_	One M8 cable gland (for single channel version)
1PF7	One thread PG7 cable gland (for double channel version)

10 — Cable lenght

L05000	5 m standard cable lenght

11 — Custom configuration

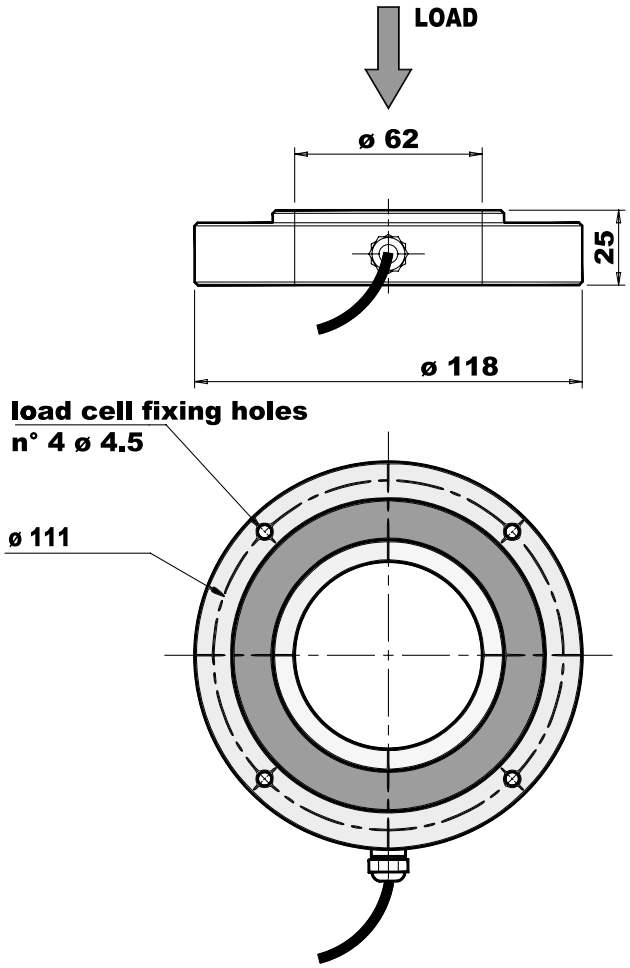
NOT	Not amplified signal

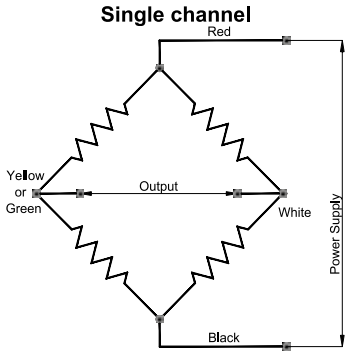
12 — Electrical connection

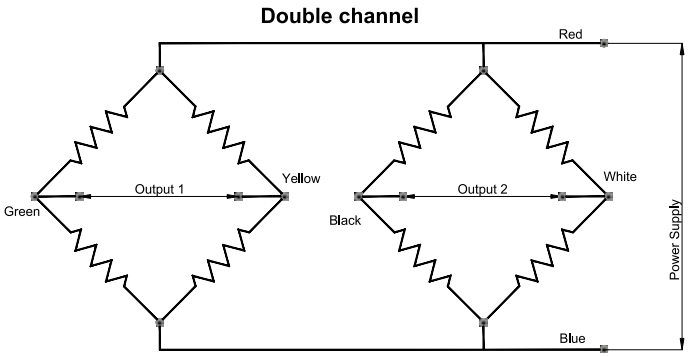
CCF	single channel	Red: Black: Yellow or Green : White: Shield:	Positive supply Negative supply Signal - Signal + Not connected
CC5	double channel	Red: Blue: Green : Yellow: Black: White: Shield:	Positive supply Negative supply Signal 1 - Signal 1 + Signal 2 - Signal 2 + Not connected

Custom configuration are available on request

Dimensions [mm]

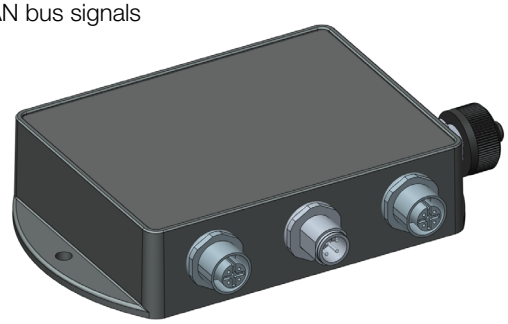






General features

- Conversion of differential or amplified signals into voltage/current amplified or CAN bus signals
- For 12/24 VDC power sources
- Double channel version available
- Protected against over tensions and polarity inversion
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- Electrical connection with M12x1 connectors



On request:
- CAN bus termination
- Customizable digital inputs

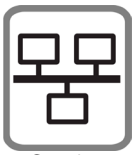
Typical fields of application:
industrial automation and generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

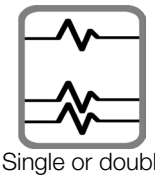
Input range

From
9 to 33 VDC

Protection Grade
IP66/IP67


Can bus
connection

Wide
temperature
range


Single or double
channel

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	one differential (mV)	Protected against short circuits and operator error (1)
Analog inputs resolution	4÷20 mA o 0.5÷4.5: 12 bit differentials: 16 bit, Gain=128	-
Differential input range	-19 mV/V ≤ d ≤ +19 mV/V @ common mode 2.5 Vdc	-
Input resistor range (strain gauge)	350 | 175 | 87 Ω ≤ Ri ≤ 10000 Ω	With VCC max @ 33 | 30 | 15 VDC (2)
Digital inputs	2	On request
Digital outputs	none	-
Analog outputs	one 4 to 20 mA or 0.5 to 4.5 VDC	1.0÷9.0 VDC on request
CANbus connection	1	
RS-232 connction	1	For diagnostic use only
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	PBT + 40% glass fiber	-
Coating	two components polyurethane	-
Standard protection grade	IP66 / IP67	-
CE Conformity	EMC Directive: 2014/30/EU	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	Heavy industrial
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Schock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

(1) Maximum current equal to 35 mA with 200 Ω shunt and for 4 to 20 mA inputs
(2) Special version with input resistance equal to 87 Ω and independent from input voltage on request

ADS-200 MkII Series

Load cell amplifier Signal converter

Ordering Code

1	2	3	4	5	6	7	8	9	10	11
Transducer type	Channel	Analog input	Input connector	Digital output	Electrical output	Output connector	CAN termination	Diagnostic	Box	Custom confguration
ADS-200 MkII	D	2.0	MC3	0	99	M3A	N	NO	B	NOT

1

Transducer type	
ADS-200 MkII	Load cell amplifier Signal converter

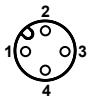
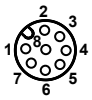
2

Channel	
S	single channel
D	double channel

3

Analog input	
x.y	Maximum input signal (mV/V)

4

Input connection			
MC4	single channel	M12 receptacle 1: VIN = 5 VDC 2: Negative for transducers 3: Signal + 4: Signal -	
MC3	double channel		
MC9	double channel	M12 receptacle 1: VIN1 = 5 VDC 2: Negative for transducers 1 3: Signal1 + 4: Signal1 - 5: VIN2 = 5 VDC 6: Negative for transducers 2 7: Signal2 + 8: Signal2 -	

5

Digital output	
0	None in standard configurations

6

Electrical output		
4_	Current output: 4 to 20 mA	(single)
7_	CAN output: CNA bus	(single)
9_	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(single)
44	Current output: 4 to 20 mA	(double)
77	CAN output: CNA bus	(double)
99	Voltage output: 0.5÷4.5 VDC. VIN=9÷33 VDC	(double)

Custom configuration are available on request

Ordering Code

1	2	3	4	5	6	7	8	9	10	11
Transducer type	Channel	Analog input	Input connector	Digital output	Output connection	Electrical connection	CAN termination	Diagnostic	Box	Custom confguration
ADS-200 MkII	D	2.0	MC3	0	99	M3A	N	NO	B	NOT

7

Electrical connection		
M75	single channel	**Current output** (4 to 20 mA) M12 plug 1: VIN = 9 to 33 VDC 2: Signal 1 3: Negative power supply 4: Signal 2 (M7A only)
M7A	double channel	
M30	single channel	**Voltage output** (0.5 to 4.5 VDC) M12 plug 1: VIN = 9 to 33 VDC 2: Signal 1 3: Negative power supply 4: Signal 2 (M3A only)
M3A	double channel	
M05	single or double channel	**CAN bus output** 1: Cable shield 2: VIN = 9 to 33 VDC 3: Negative power supply 4: CH 5: CL

M12 plug

8

CAN termination	
N	Without internal CAN bus termination

9

Diagnostic	
PC	RS232 connection
NO	None

10

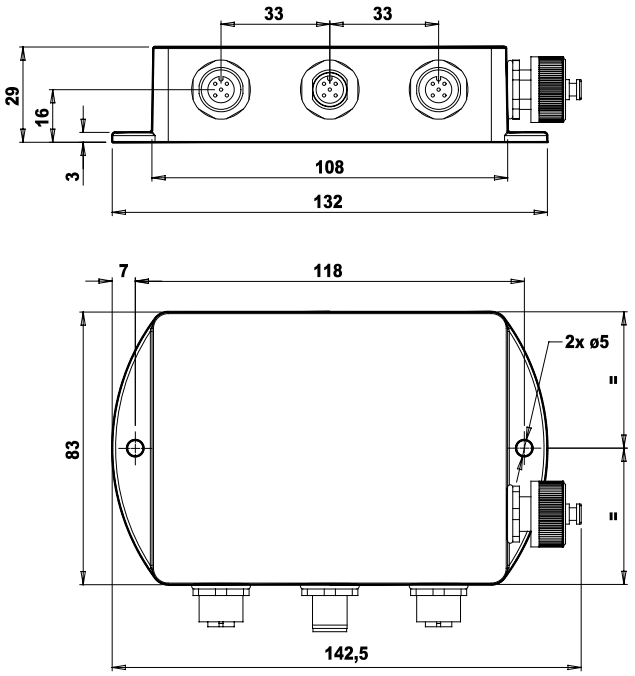
Box	
B	With standard box

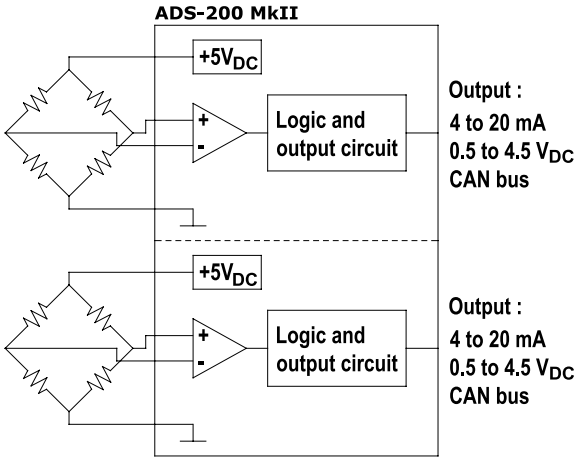
11

Custom configuration	
NOT	Standard

Custom configuration are available on request

Dimensions [mm]





Accessories

Type	Description	Notes
Counterpart Connector	Cable mount M12 plug connector: loose connector with 4pin, screw terminals.	input connection
Counterpart Connector	Cable mount M12 plug connector: loose connector with 8pin, screw terminals.	input connection
Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 4pin, screw terminals.	output connection
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/ green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.	output connection
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 4 conductors (brown, grey, black, yellow/ green) sections 0.5mm², external grey jacket with excellent resistance to abrasive action, ordinary industrial oils and chemical agents. M12 4pin receptacle connector.	
CAN Counterpart Connector	Cable mount M12 receptacle connector: loose connector with 5pin, screw terminals.	output connection
Cable 5m female / Stripped wires	Length 5m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.	output connection
Cable 10m female / Stripped wires	Length 10m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.	
Cable 15m female / Stripped wires	Length 15m, multipolar cable for dynamic installations, 2x2xAWG22 conductors (brown, white, yellow, green) , external purple jacket with excellent resistance to abrasive action, ordinary industrial oils, chemical agents and UV. M12 5pin receptacle connector.	
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 Serial cable RS-232 DB9/M12 L=4m; • 1 USB/RS-232 DB9 adapter;	
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (M12x1 4pin receptable connector) L=4m	
USB adapter	USB/RS-232 DB9 adapter	

General features

- Direct piloting of five double ON/OFF solenoid valves and one proportional solenoid valve
- Current closed loop control
- Output for venting valve
- Digital input for start-up safety check
- Same power supply for 12/24 VDC systems
- Waterproof, plastic, compact body
- Electrical connection with «FCI Sicma 2» connector
- Customizable via RS-232 serial port to support all commercial joystick
- BPEterminal custom software can be used to change, for each section, the following parameters and many others:
  - PWM frequency
  - minimum and maximum currents
  - proportional solenoid valve opening and closing ramps

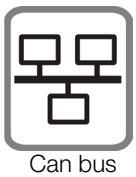
On request:
- CAN bus interface
- Double-checked output for venting valve. Suitable for systems up to PL d (EN 13849-1)
- Two customizable digital inputs

Typical fields of application:
bancable hydraulic valves for industrial and mobile applications.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

From 9 to 33 VDC

Protection Grade IP66/IP67


Can bus connection

Wide temperature range

PWM


EASY PC SETUP with BPE terminal

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs for joystick	five 0 to 5 VDC or five 0 to10 VDC or five 4 [1] to 20 mA	Protected against short circuits and operator errors
Digital inputs	1 + 2 (on request)	1 input only if CAN bus connection is present
ON/OFF digital outputs	5x2	Positive. IMAX = 3 A. Protected against short circuits
Proportional PWM outputs	1	Positive. Programmable from 70 to 250 Hz. IMAX = 2 A. Protected against short circuits
Digital outputs	1	Positive. IMAX = 3 A. Protected against short circuits
CAN bus interface	1	On request
RS-232 interface	1 for calibration and diagnostic	AMP Superseal 1.5 series 3P connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP66 / IP67	-
CE Conformity	EMC Directive: 2014/30/EU	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

[1] Or 0 to 20 mA, without range check

Ordering Code

1	2	3	4	5	6
Digital management	Output type	Input type	Control valves	Active movements	PWM frequency
MAV1152	F	V3	5	1	150

1

Digital management	
MAV1152	ON/OFF solenoid valve digital management

2

Output type	
W	PWM outputs for proportional valves
F	12/24 Vdc static outputs for ON/OFF valves

3

Input type	
V3	Analog voltage input 0.5÷4.5 Vdc (rest position: 2.5V)

4

Control valves	
2	Two double elements
4	Four double elements
5	Five double elements

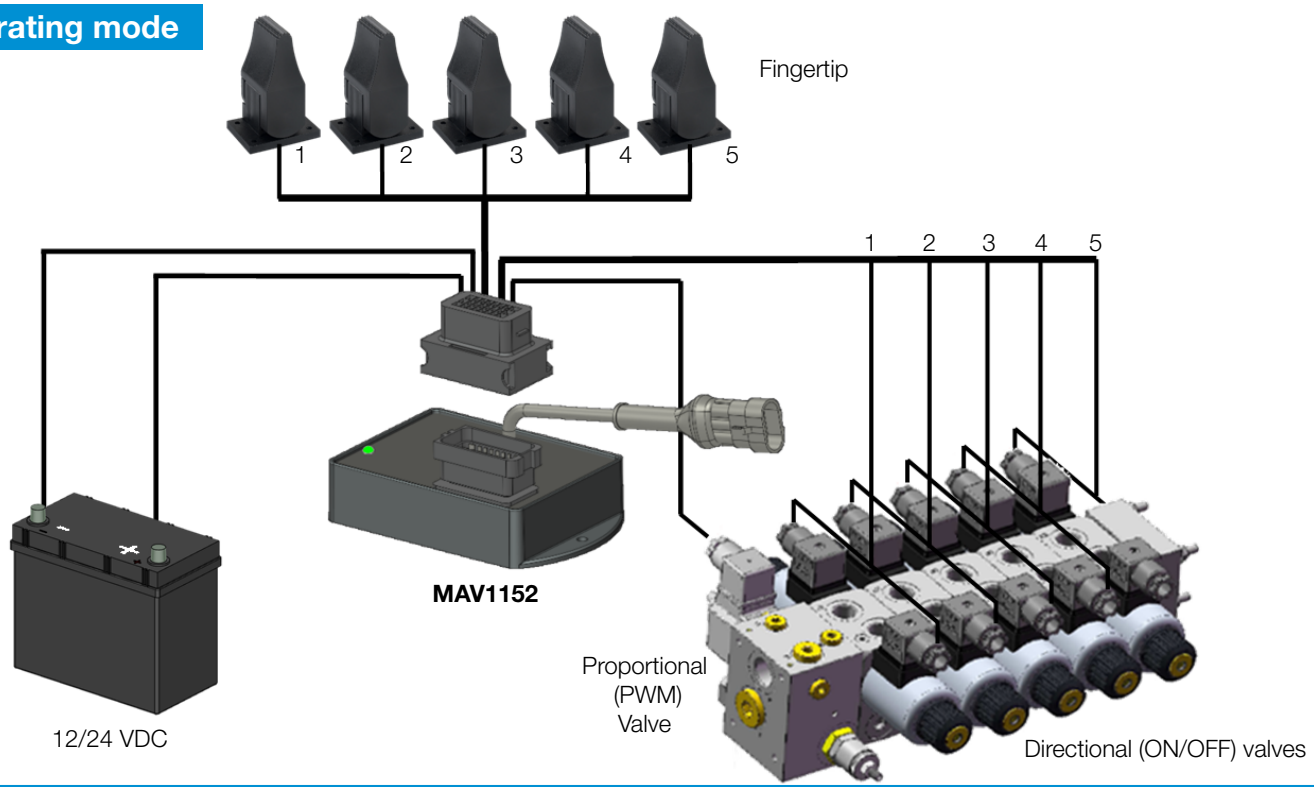
5

Active movements	
1	One movement active at a time

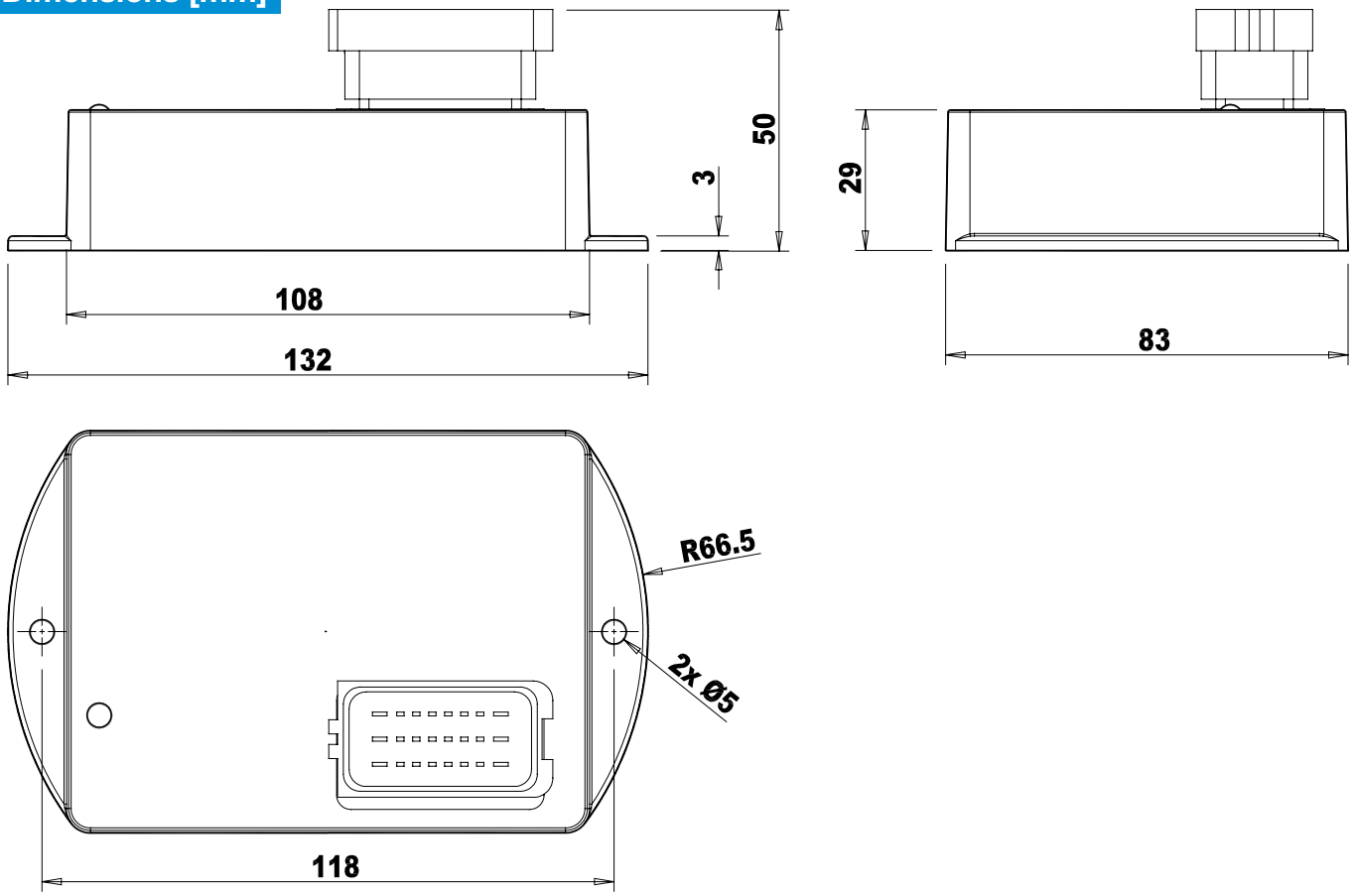
6

PWM frequency	
150	Default value, adjustable via configuration software (range 70 ÷250 Hz)

Operating mode



Dimensions [mm]



Accessories

Type	Description
Counterpart Connector kit	SICMA FCI 24pin connector composed by: • 1 FCI Black Connector Female Housing 24 ways • 18 female terminals 1.5mm • 6 female terminals 2.8mm • 1 Locking cam for 24w Female Housing • 20 Filler plugs • 1 Rubber cap
Caps for connector	211 series SICMA FCI caps kit composed by nr. 20 green filler plugs.
Cable 1m female / Stripped wires	L=1m black extension cable, 24x1.5-1 SICMA FCI 24pin, numbered.
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 RS-232 serial connection cable L=4m; • 1 RS-232 AMPSSEAL/Modu2 serial adapter; • 1 USB/RS-232 DB9 adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
AMP Sseal serial adapter	AMP Sseal 3p connector adapter for serial cables.
Usb adapter	USB/RS-232 DB9 adapter

MAV4211 SH Series

Hydrostatic trasmission control

General features

- Customized for hydrostatic pumps and motors management
- Five preset operating modes
- Variable displacement pumps management
- Fully independent brakes management
- Can be supplied factory set
- With BPEterminal custom software it is possible to configure all commercial joysticks and, for every movement, to set:
  the PWM frequency, the minimum and maximum currents,
  the proportional solenoid valve opening and closing ramps
- Same power supply for 12/24 VDC systems
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- Electrical connection with FCI SICMA2

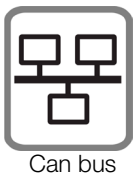
On request:
- CAN bus interface

Typical fields of application:
hydrostatic trasmission, closed and open loop pumps management.

Note:
The user/installer is responsible for evaluating the values and, thus, the safety of the application.

From
9 to 33 VDC

Protection
Grade IP67


Can bus
connection

Wide
temperature
range

PWM


EASY PC SETUP
with BPE terminal

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs for joystick	two 0 to 5 VDC or	
two 0 to10 VDC or two 4 to 20 mA	Protected against short circuits and operator errors	
Digital inputs	3	1 input only if CAN bus connection is present
Proportional PWM outputs	2x2 + 1	Positive. Programmable from 70 to 250 Hz.
IMAX = 2 A. Protected against short circuits		
Digital outputs	2	Positive. IMAX = 3 A. Protected against short circuits (1)
CAN bus connection	1	On request
RS-232 connection	1	AMP Superseal 1.5 series 3P connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP67	-
CE Conformity	EMC Directive: 2014/30/EU	-
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	Heavy industrial
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

(1) Available and programmable on request in PLd (EN 13849-1)

Ordering Code

1	2	3	4	5	6	7	8	9	10
Trasmission management	Output type	Input type	Control valves	PWM frequency	Min. current	Max. current	Hydraulic pre-selection	Operating mode	Version
MAV4211SH	W	V3	2	110	0200	0600	A	SH1	_N

1

Trasmission control	
MAV4211SH	Hydrostatic trasmission control

2

Output type	
W	PWM outputs for proportional valves

3

Input type	
V3	Analog voltage input 0.5÷4.5 Vdc (rest position: 2.5V)

4

Control valves	
2	Two double elements

5

PWM frequency	
110	Default value, adjustable via configuration software (range 70 ÷ 250 Hz)

6

Min. current	
0200	Default value, adjustable via configuration software (range 0 ÷ 2000 mA)

7

Max. current	
0600	Default value, adjustable via configuration software (range 0 ÷ 2000 mA)

8

Hydraulic pre-selection	
A	Digital input to enable oil flow

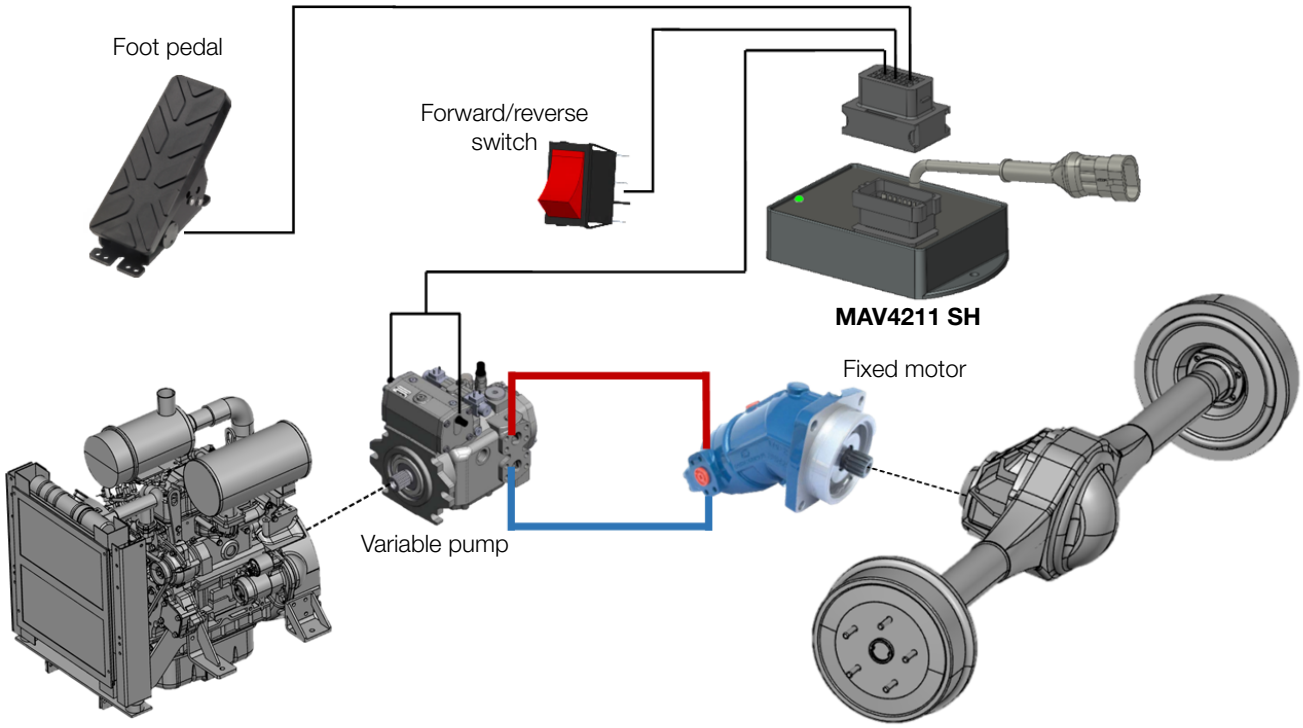
9

Operating mode	
SH1	Default operating mode 1 (configurable via software)

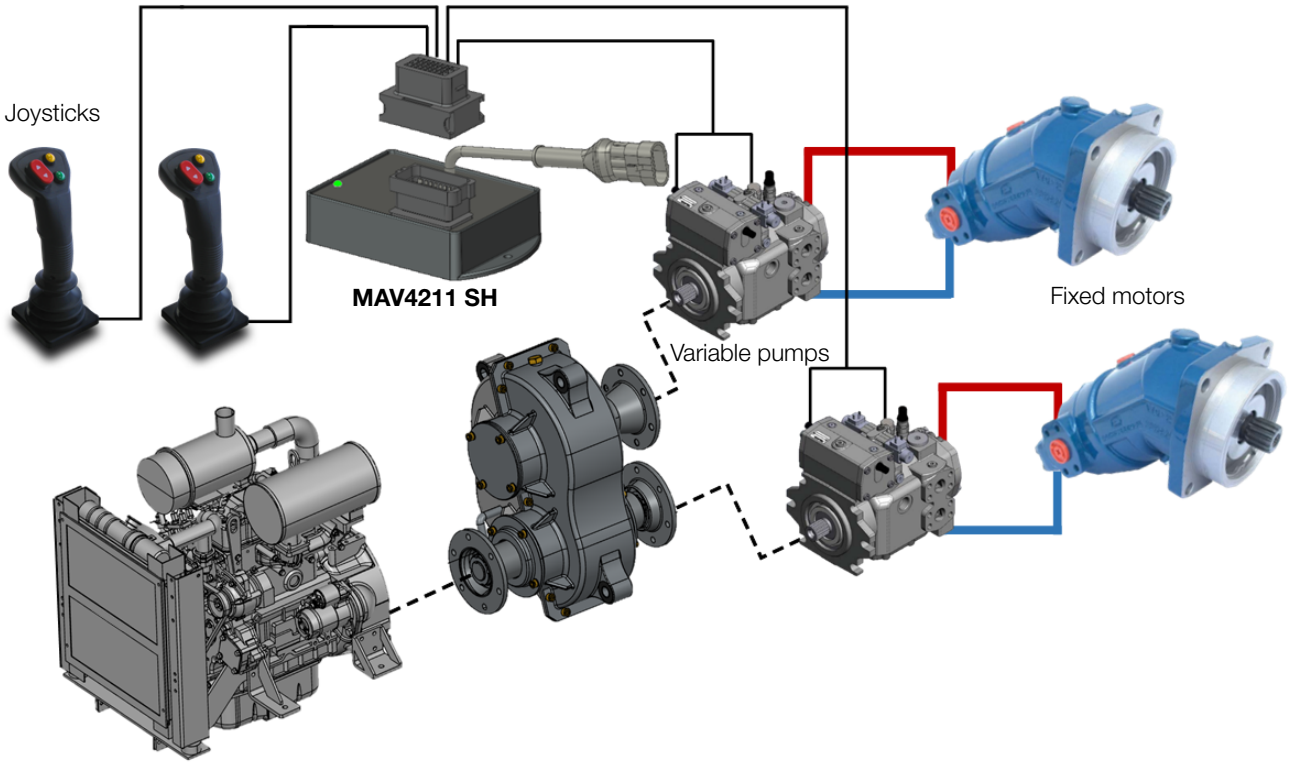
10

Version	
_N	Standard

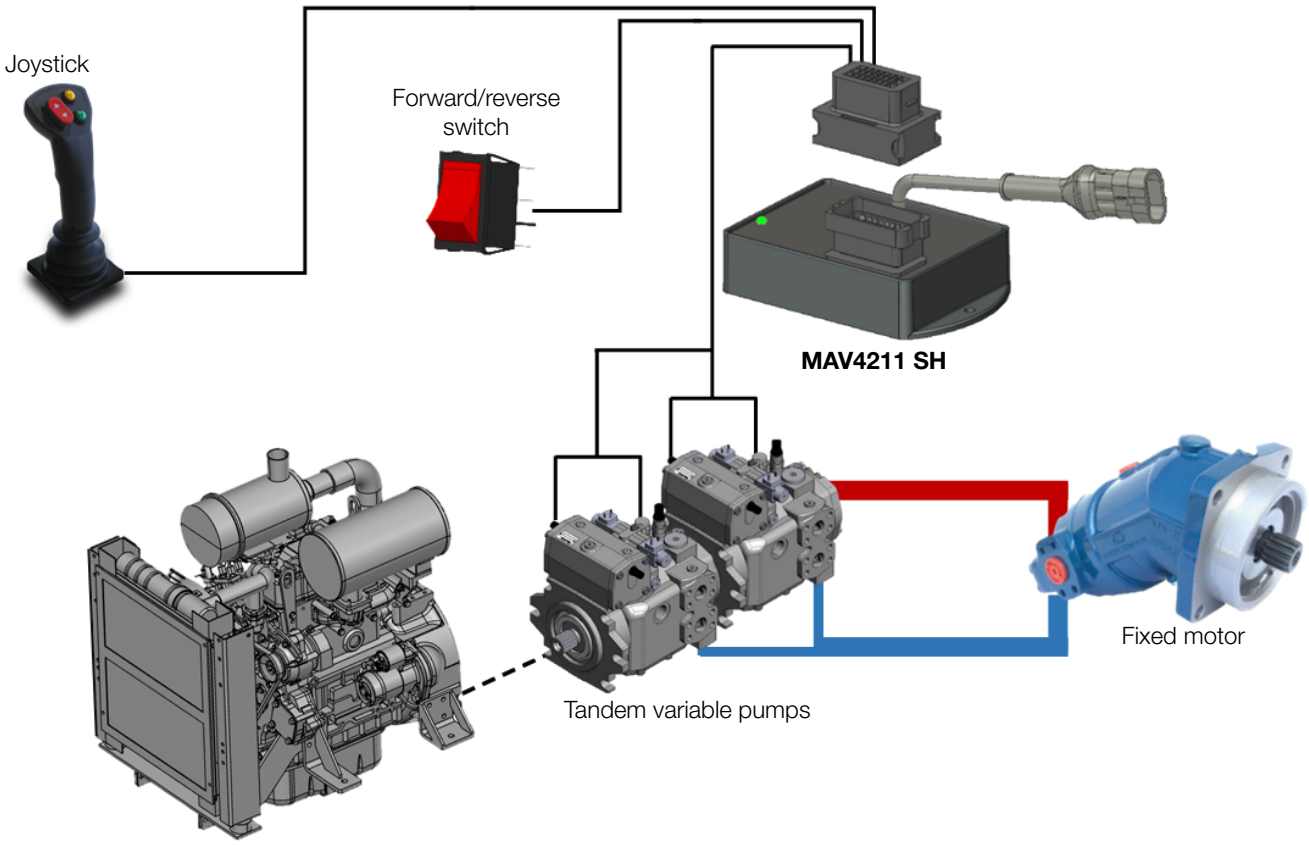
Operating mode 1



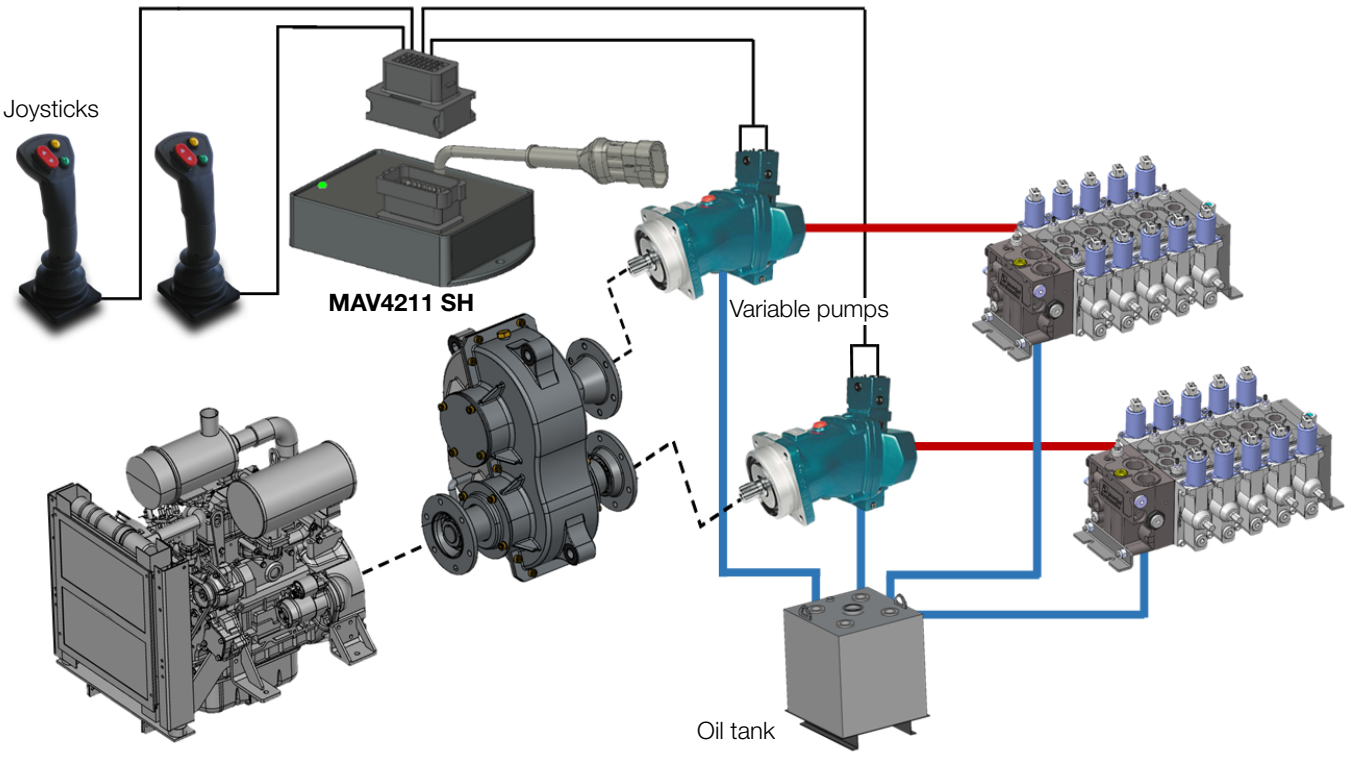
Operating mode 2



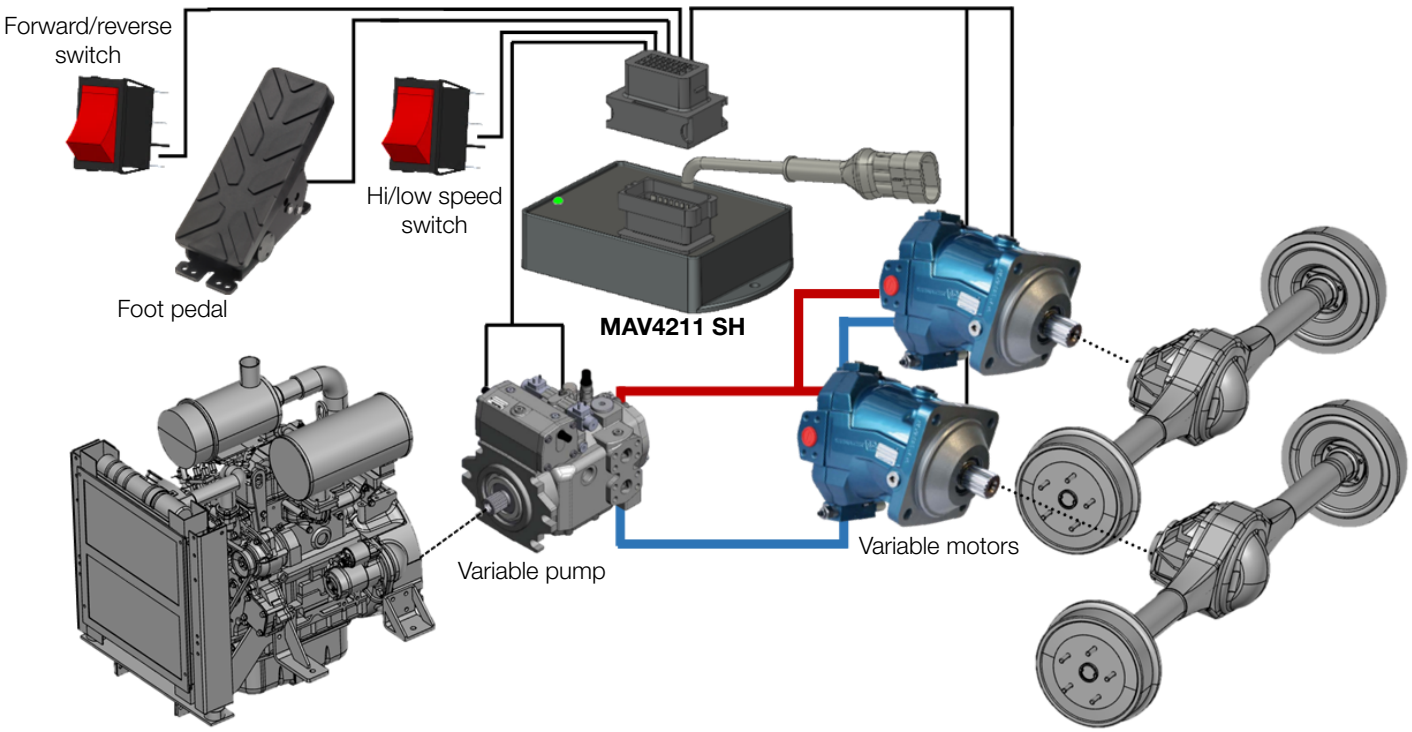
Operating mode 3



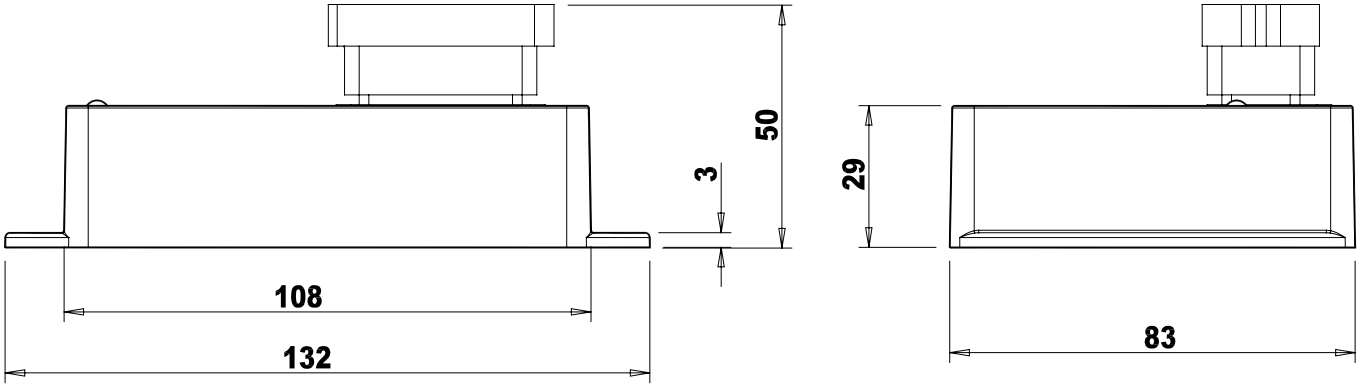
Operating mode 4

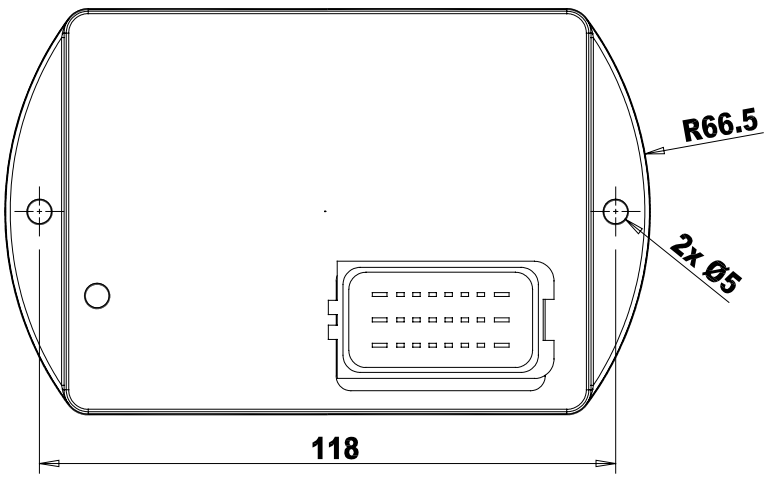


Operating mode 5



Dimensions [mm]





General features

- Direct piloting of four proportional solenoid valves
- Output for venting valve
- Start-up safety control digital input
- Same power supply for 12/24 VDC systems
- With BPEterminal custom software is possible to configure all commercial joysticks and, for every movement, to set: the PWM frequency, the minimum and maximum currents, the proportional solenoid valve opening and closing ramps
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- Electrical connection with FCI SICMA2

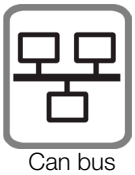
On request:
- CAN bus interface
- PL d (EN 13849-1) output for venting valve
- Two customizable digital inputs

Typical fields of application:
bancable hydraulic valves for industrial and mobile applications.

Note:
The user/installer is responsible for evaluating the values and, thus, the safety of the application.

From 9 to 33 VDC

Protection Grade IP67


Can bus connection

Wide temperature range

PWM


EASY PC SETUP with BPE terminal

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs for joystick	four 0 to 5 VDC or four 0 to10 VDC or	
four 4(1) to 20 mA	Protected against short circuits and operator errors	
Digital inputs	1 + 2 (on request)	1 input only if CAN bus connection is present
ON/OFF digital outputs	-	-
Proportional PWM outputs	4x2	Positive. Programmable from 70 to 250 Hz.
IMAX = 2 A. Protected against short circuits	2	Positive. IMAX = 3 A. Protected against short circuits (1)
Digital outputs	1	Positive. IMAX = 3 A. Protected against short circuits (2)
CAN bus connection	1	On request
RS-232 connection	1	AMP Superseal 1.5 series 3P connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP67	-
CE Conformity	EMC Directive: 2014/30/EU	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	Heavy industrial
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

(1) Or 0 to 20 mA, without range check
(2) Available and programmable on request in PLd (EN 13849-1)

Ordering Code

1	2	3	4	5
Digital management	Output type	Input type	Control valves	PWM frequency
MAV4211	W	V3	4	150

1

Digital control	
MAV4211	Proportional solenoid valve digital control

2

Output type	
W	PWM outputs for proportional valves

3

Input type	
V3	Analog voltage input 0.5÷4.5 Vdc (rest position: 2.5V)

4

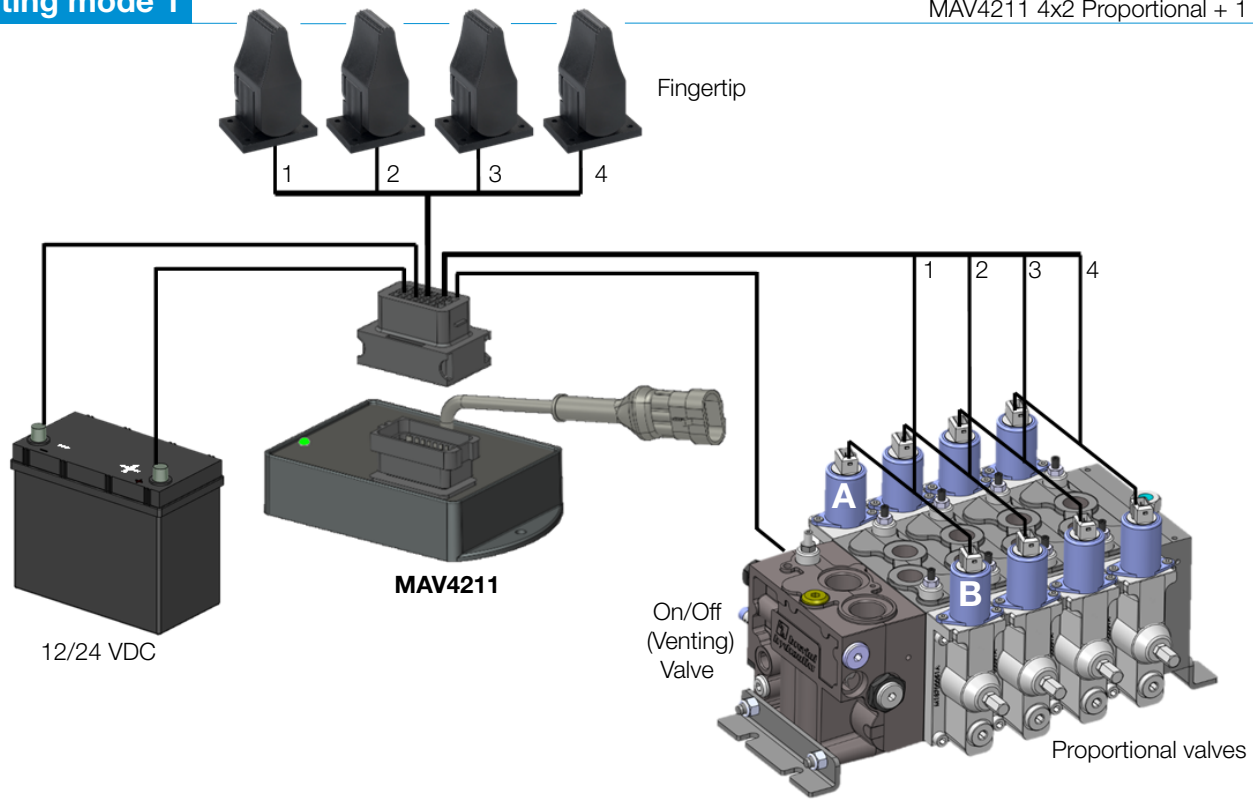
Control valves	
4	Four double elements

5

PWM frequency	
150	Default value, adjustable via configuration software (range 70 ÷ 250 Hz)

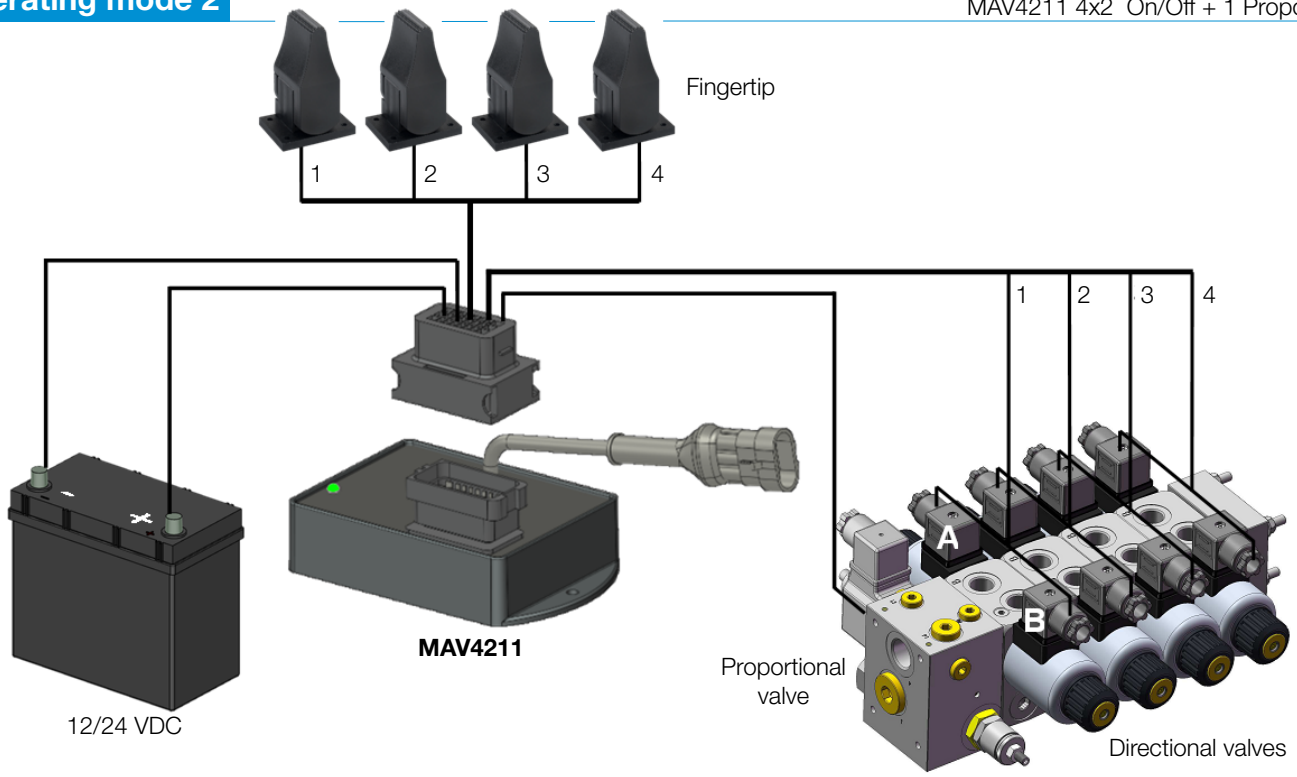
Operating mode 1

MAV4211 4x2 Proportional + 1 On/Off

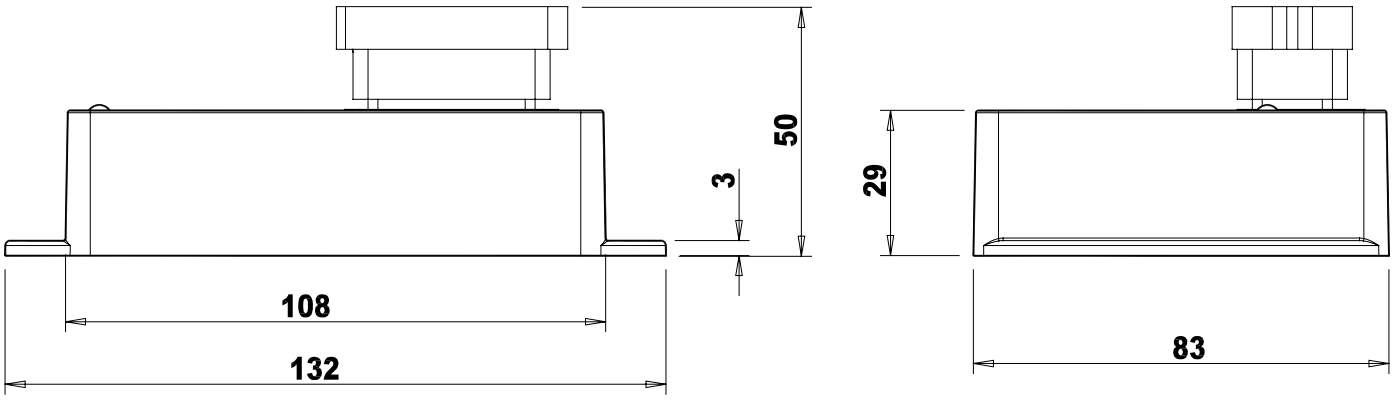


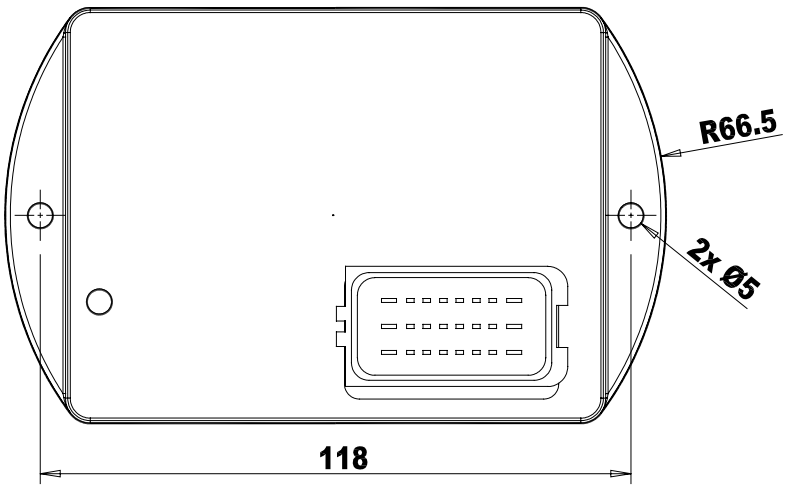
Operating mode 2

MAV4211 4x2 On/Off + 1 Proportional



Dimensions [mm]





M92 Load Series Programmable basket load limiter

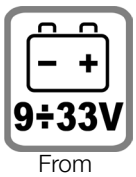
General features

- Load limiting system for basket platforms
- Two double-checked outputs, suitable for systems up to PL d (EN 13849-1)
- Two analog inputs to read a double load cell
- Analog low signal direct inputs for 0.5 mV up to 19 mV signals
- Same power supply for 12/24 VDC systems
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- Electrical connection with FCI SICMA2
- Easy max load calibration
- RS-232 serial interfaceOn request:

On request:
- CAN bus interface

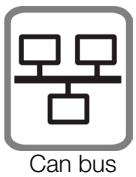
Typical fields of application:
access platform

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



From
9 to 33 VDC

Protection Grade
IP66/IP67


Can bus
connection

Wide
temperature
range

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	2	From 0.5 mV to 19 mV
Digital inputs	4	-
ON/OFF safety outputs	2	Double-checked, suitable for PLd (EN 13849-1) Positive. IMAX = 3 A. Protected against short circuits
ON/OFF signal outputs	5	Positive. IMAX = 3 A. Protected against short circuits
CAN bus interface	1	On request
RS-232 interface	for calibration and diagnostic	AMP Superseal 1.5 series 3P connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP66 / IP67	-
CE Conformity	EMC Directive: 2014/30/EU Machine Directive: 2006/42/EC	-
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

Ordering Code

1	2	3	4	5	6	7	8	9
Load limiter type	Ouput type	Pressure sensor	Additional transducers	Reset input	Safety level	Alarm levels	CAN communication	Firmware version
M92	P2	NO_	2TD_	NOT	PLd	_2	NOT	NOT

1

Load limiter type	
M92	Programmable basket load limiter

2

Ouput type	
P2	Two safety outputs (12/24 Vdc positive outputs)

3

Pressure sensor	
NO_	Not used

4

Additional transducers	
2TD_	Two independent strain transducers (or one double)

5

Reset input	
NOT	Without reset or restore commands

6

Safety level	
PLd	Compliant with safety requirements for systems up to PLd (EN 13849-1)

7

Alarm levels	
_2	2 alarm levels (pre-alarm/alarm)

8

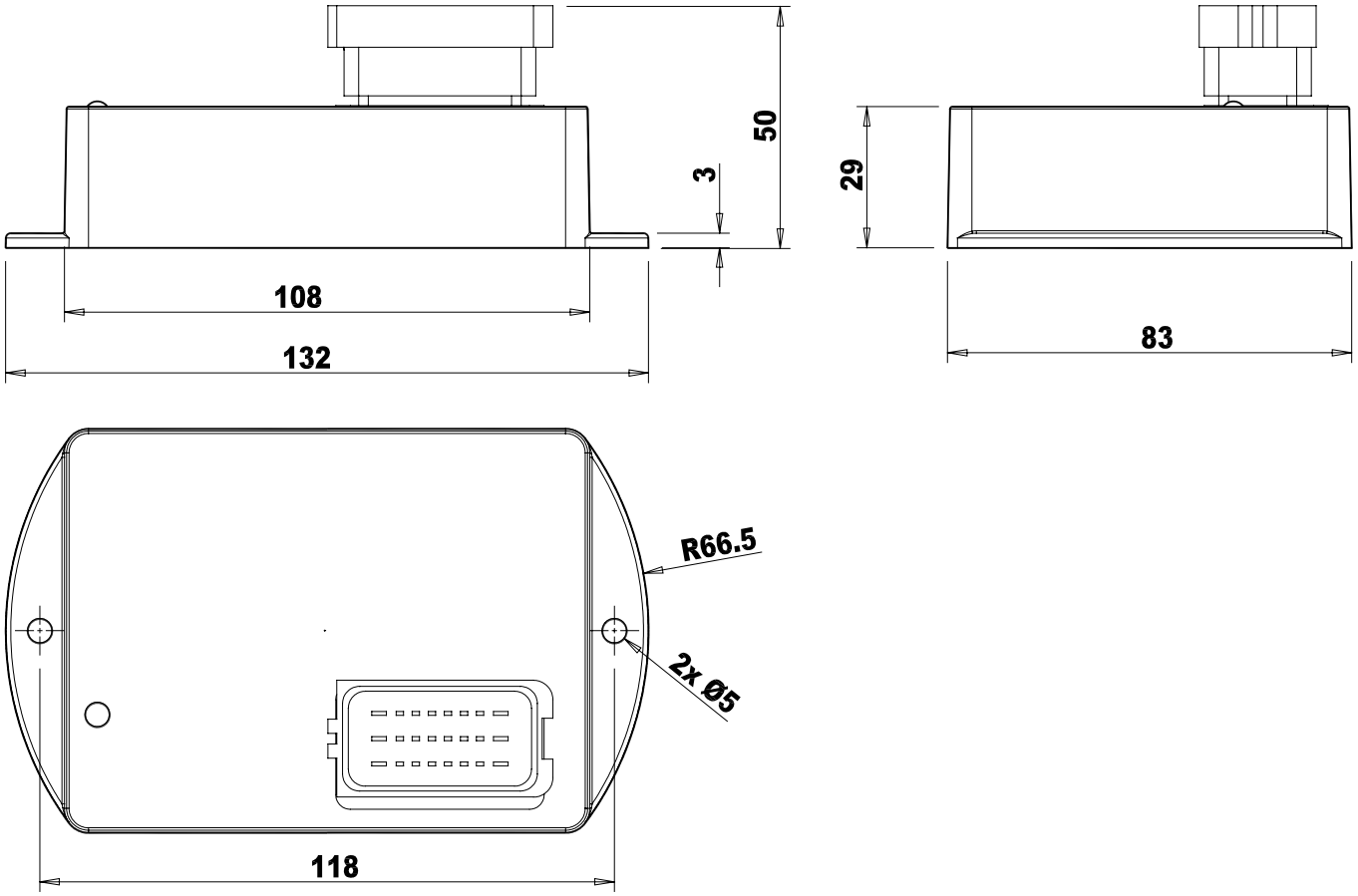
CAN communication	
CAN	1 CAN bus channel
NOT	Not available

9

Firmware version	
NOT	Standard

Custom configuration are available on request

Dimensions [mm]



Accessories

Type	Description
Counterpart Connector kit	SICMA FCI 24pin connector composed by: • 1 FCI Black Connector Female Housing 24 ways • 18 female terminals 1.5mm • 6 female terminals 2.8mm • 1 Locking cam for 24w Female Housing • 20 Filler plugs • 1 Rubber cap
Caps for connector	211 series SICMA FCI caps kit composed by 20 green filler plugs.
Cable 1m female / Stripped wires	L=1m black extension cable, 24x1.5-1 SICMA FCI 24pin, numbered.
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 RS-232 serial connection cable L=4m; • 1 RS-232 AMPSSEAL/Modu2 serial adapter; • 1 USB/RS-232 DB9 adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
AMP Sseal serial adapter	AMP Sseal 3p connector adapter for serial cables.
USB adapter	USB/RS-232 DB9 adapter

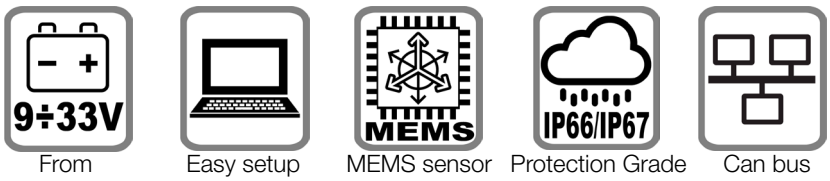
General features

- Load limiting system for scissor platforms
- Based on height (angle) and pressure measurement
- Two double-checked outputs, suitable for systems up to PL d (EN 13849-1)
- Same power supply for 12/24 VDC systems
- Tilt device features with internal MEMS sensor
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- CAN bus interface
- Electrical connection with FCI SICMA2
- Easy automatic setting phase for max load
- RS-232 serial interface

On request:
Display connected via CAN bus interface, to order separately

Typical fields of application:
scissor access platoforms

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



From 9 to 33 VDC | Easy setup | MEMS sensor technology | Protection Grade IP66/IP67 | Can bus connection

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	Up to 4 inputs for pressure transmitters	Protected against short circuits and operator errors
Digital inputs	Up to 5	-
ON/OFF safety outputs	2	Double-checked outputs, suitable for PLd (EN 13849-1) Positive. IMAX = 3 A. Protected against short circuits
ON/OFF signal outputs	Up to 7	Positive. IMAX = 3 A. Protected against short circuits
CAN bus interface	1	
RS-232 interface	for calibration and diagnostic	AMP Superseal 1.5 series 3P connector (282105-1)
Operating temperature	from -20 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP66 / IP67	-
CE Conformity	EMC Directive: 2014/30/EU Machine Directive: 2006/42/EC	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

Ordering Code

1	2	3	4	5
Load limiter type	Operating mode	No. of angle transducer	No. of pressure transducer	Safety level
M92-Sc	PU24	2TA	2TPV	PLd

1

Load limiter type	
M92-Sc	Load limitation system for scissor platform

2

Operating mode	
PU24	One output to limit rise, one output to limit descent
PU25	One output for max height condition, one output for overload condition
PU26	One output to limit rise and tilt, one output to limit descend and tilt
PU27	One output for max height condition or tilt condition, one output for overload condition or tilt condition

3

No. of angle transducer	
2TA	Double angle transducer

4

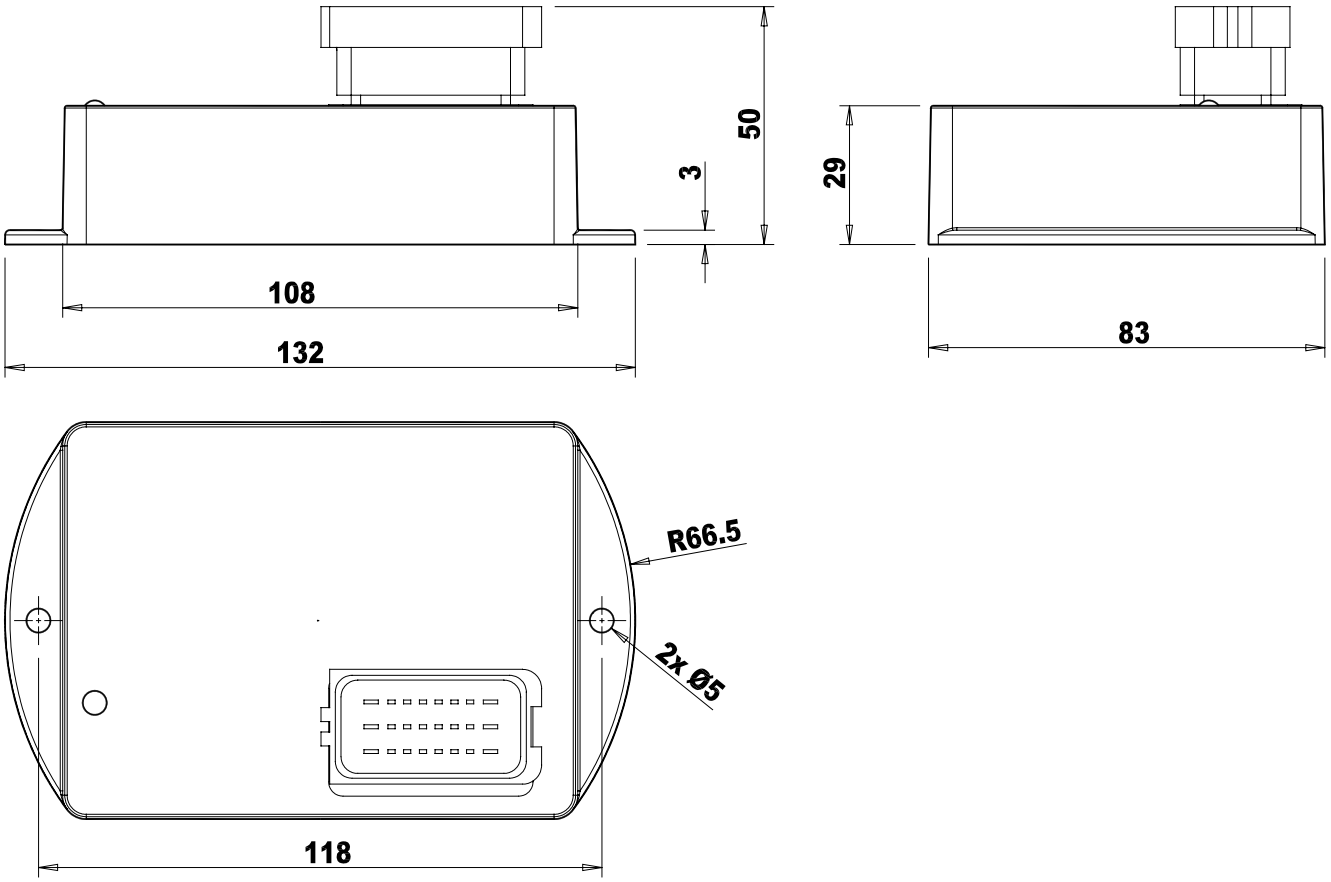
No. of pressure transducer	
2TPV	For single phase cylinder (pressure transducer tilt on bottom side only)
4TPV	For double phase cylinder (pressure transducer tilt on bottom and rod side)

5

Safety level	
PLd	Safety level for the two safety outputs

Custom configuration are available on request

Dimensions [mm]



Accessories

Type	Description
Counterpart Connector kit	SICMA FCI 24pin connector composed by: • 1 FCI Black Connector Female Housing 24 ways • 18 female terminals 1.5mm • 6 female terminals 2.8mm • 1 Locking cam for 24w Female Housing • 20 Filler plugs • 1 Rubber cap
Caps for connector	211 series SICMA FCI caps kit composed by 20 green filler plugs
Cable 1m female / Stripped wires	L=1m black extension cable, 24x1.5-1 SICMA FCI 24pin, numbered.
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 RS-232 serial connection cable L=4m; • 1 RS-232 AMPSSEAL/Modu2 serial adapter; • 1 USB/RS-232 DB9 adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
AMP Sseal serial adapter	AMP Sseal 3p connector adapter for serial cables.
USB adapter	USB/RS-232 DB9 adapter

M82E Moment Series Programmable moment limiter

General features

- Moment limiting system for access platforms
- Double-checked output, suitable for systems up to PL d (EN 13849-1)
- Six analog inputs to read:
  - two angle sensor (or one double)
  - two pressure transmitter (main cylinder bottom side)
  - two pressure transmitter (main cylinder rod side)
- Easy calibration via push buttons and LEDs on board or via RS-232 serial port
- Diagnostic through LEDs on board or via RS-232 serial port
- Digital outputs for alarm and pre-alarm signaling
- More alarm levels available
- Same power supply for 12/24 VDC systems
- Auto test for:
  - short circuit on power outputs
  - transducers open or in short circuit
- short circuit on power outputs
- transducers open or in short circuit
- Plastic, compact, resin body
- Electrical connection with Molex Mini-Fit® and Sauro CVF connectors (counterparts provided)
- RS-232 serial interface

On request:
- Working states data log
- Special functions
- Enhanced power safety outputs
- Input for zero check
- Doubled PL c output (according to EN13849-1) version for cranes

Typical fields of application:
access platforms, cranes (PL c version)

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application

From 9 to 33 VDC | Micro switches | LEDs on board | 7-segments display | Wide temperature range

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	six 0.5 to 4.5 VDC or 4 to 20 mA (PL d version) four 0.5 to 4.5 VDC or 4 to 20 mA (PL c version)	-
Digital inputs	8	
ON/OFF safety outputs	2 with three relays (one double, two single)	Independent. PL d (according to EN13849-1) IMAX = 3 A. Protected against short circuits or IMAX = 3+3 A. Not protected against short circuits
ON/OFF signal outputs	2	Positive. IMAX = 3 A. Protected against short circuits
RS-232 interface	for calibration and diagnostic	AMP Modu 2 connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	ABS	-
Coating	two components polyurethane	-
CE Conformity	EMC Directive: 2014/30/EU Machine Directive: 2006/42/EC	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 90 years	-

Ordering Code

1	2	3	4	5	6	7	8	9
Moment limiter type	Ouput type	Position transducer	Additional transducers	Reset input	Safety level	Alarm levels	Case type	Output number
M82E	P2C0	2TA	_2DV	NOT	PLd_	_2	R	2O

1

Load limiter type	
M82E	Programmable moment limiter

2

Ouput type	
P2C0	Two safety outputs (12/24 Vdc positive outputs)

3

Position transducer	
NOT	Not used
2TA	Two single angle transducers

4

Additional transducers		
		MODE
1TPA	single pressure – 1 transducer (signal type: 4÷20 mA)	0A
_1DA	differential pressure – 2 transducers (signal type: 4÷20 mA)	D
_2DA	double independent differential pressures – 4 transducers (signal type: 4÷20 mA)	D2
_2DV	double independent differential pressures – 4 transducers (signal type: 0.5÷4.5 Vdc)	D2

5

Reset input	
NOT	Without reset or restore command

6

Safety level	
PLc_	Hardware architecture suitable for PL c
PLd_	Hardware architecture suitable for PL d

7

Alarm levels	
_2	Two alarm levels

8

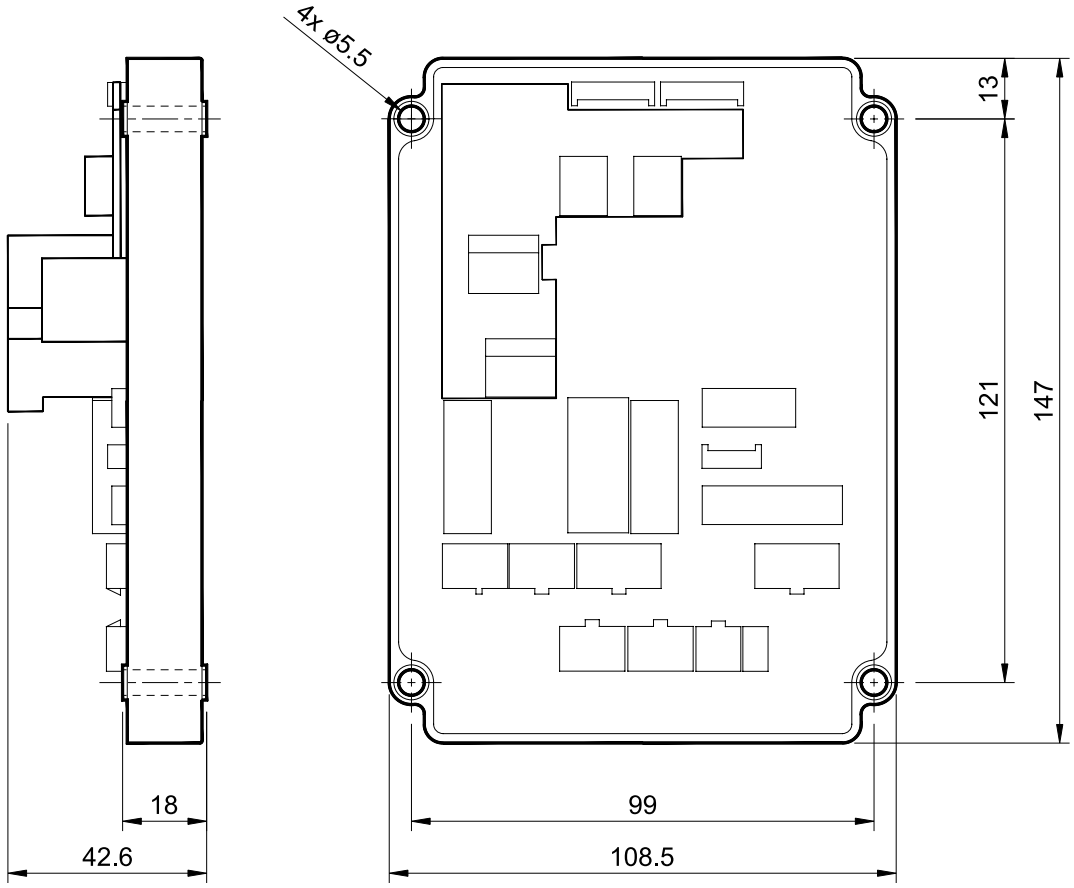
Case type	
R	Resin box

9

Output number	
2O	Two ouputs

Custom configuration are available on request

Dimensions [mm]



Accessories

Type	Description
MOLEX 4 Counterpart Connector kit	MOLEX 4 pin plug connector composed by: • 1 loose connector 4 pin; • 4 female terminals.
MOLEX 6 Counterpart Connector kit	MOLEX 6 pin plug connector composed by: 1 loose connector 6 pin; 6 female terminals.
100 MOLEX female	100 MOLEX female terminals .
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 RS-232 serial connection cable L=4m; • 1 RS-232 AMPSSEAL/Modu2 serial adapter; • 1 USB/RS-232 DB9 adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
USB adapter	USB/RS-232 DB9 adapter

General features

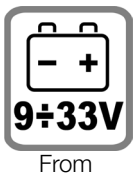
- Load limiting system for basket platforms
- Double-checked output, suitable for systems up to PL d (EN 13849-1)
- Two independent channels for double load cells
- Analog low signal direct inputs for 0.5 mV up to 19 mV signals
- Easy calibration via push buttons and LEDs on board or via RS-232 serial port
- Diagnostic through LEDs on board or via RS-232 serial port
- Digital outputs for alarm and pre-alarm signaling
- More alarm levels available
- Same power supply for 12/24 VDC systems
- Auto test for:
  - short circuit on power outputs
  - transducers open or in short circuit
- Plastic, compact, resin body
- Electrical connection with Molex Mini-Fit® and Sauro CVF connectors (counterparts provided)
- RS-232 serial interface

On request:

- Analog inputs to read amplified load cells
- Self-calibration push button
- Working states data log
- Special functions
- Enhanced power safety outputs
- Input for zero check

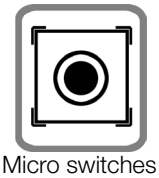
Typical fields of application:
access platforms

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



From 9 to 33 VDC

Direct mV analog inputs


Micro switches


LEDs on board

Wide temperature range

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	two differential	From 0.5 mV to 19 mV
Digital inputs	8	
ON/OFF safety outputs	2 with three relays (one double, two single)	Independent. PL d (according to EN13849-1) IMAX = 3 A. Protected against short circuits or IMAX = 3+3 A. Not protected against short circuits
ON/OFF signal outputs	3	Positive. IMAX = 3 A. Protected against short circuits
RS-232 interface	for calibration and diagnostic	AMP Modu 2 connector (282105-1)
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.40 kg	-
Housing material	ABS	-
Coating	two components polyurethane	-
CE Conformity	EMC Directive: 2014/30/EU Machine Directive: 2006/42/EC	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 90 years	-

Ordering Code

1	2	3	4	5	6	7	8	9
Moment limiter type	Ouput type	Position transducer	Additional transducers	Reset input	Safety level	Alarm levels	Case type	Output number
M82	P2C0	NOT	_2TD	NOT	PLd_	_2	R	2O

1

Load limiter type	
M82	Programmable basket load limiter

2

Ouput type	
P2C0	Two safety outputs (12/24 Vdc positive outputs

3

Position transducer	
NOT	Not used

4

Additional transducers	
_2TD	two independent strain transducers (or one double

5

Reset input	
NOT	Without reset or restore command

6

Safety level	
PLc_	Hardware architecture suitable for PL c
PLd_	Hardware architecture suitable for PL d

7

Alarm levels	
_2	Two alarm levels

8

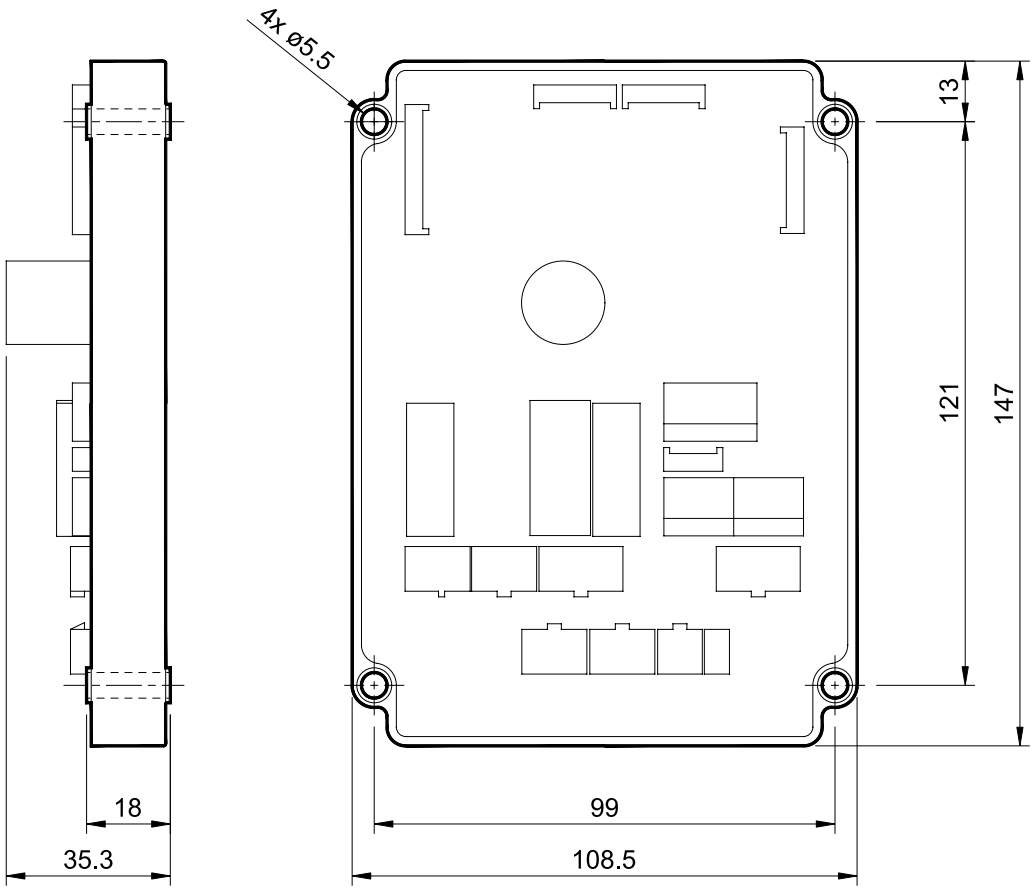
Case type	
R	Resin box

9

Output number	
2O	Two ouputs

Custom configuration are available on request

Dimensions [mm]



Accessories

Type	Description
MOLEX 4 Counterpart Connector kit	MOLEX 4 pin plug connector composed by: • 1 loose connector 4 pin; • 4 female terminals.
MOLEX 6 Counterpart Connector kit	MOLEX 6 pin plug connector composed by: 1 loose connector 6 pin; 6 female terminals.
100 MOLEX female	100 MOLEX female terminals .
RS-232 connection kit	RS-232/USB connection kit for BPE boards, composed by: • 1 RS-232 serial connection cable L=4m; • 1 RS-232 AMPSSEAL/Modu2 serial adapter; • 1 USB/RS-232 DB9 adapter;
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to BPE boards (AMPModu2 connector) L=4m
USB adapter	USB/RS-232 DB9 adapter

GP200 MkII Series Outriggers auto-leveling system

General features

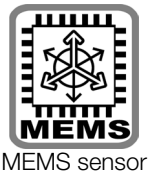
- Integrated MEMS technology tilt sensor with no moving parts
- Same power supply for 12/24 VDC systems
- 4x2 ON/OFF outputs for outriggers descent/rise management
- Two signalling digital outputs for outriggers on the ground and leveled system signalling
- BPEterminal custom software for easy customization

On request:
- CAN bus interface
- PL d (EN 13849-1) output for venting valve
- Two customizable digital inputs

Typical fields of application:
access platforms, truck mounted cranes.

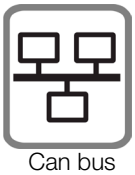
Note:
The user/installer is responsible for evaluating the values and, thus, the safety of the application.

From
9 to 33 VDC



MEMS sensor
technology

Protection Grade
IP66/IP67


Can bus
connection


EASY PC SETUP
with BPE terminal

Technical Data

Power supply	from 9 to 33 VDC	Protected against polarity reversal
Digital inputs	9	7, if the CAN bus connection is available
ON/OFF digital outputs	4x2	Positive. Imax = 3 A. Protected against short circuits
PWM proportional outputs	1	ON request
Digital outputs	2	Positive. Imax = 3 A. Protected against short circuits
Accuracy	1% FS	-
Resolution	0.1 degree	-
Temperature drift (zero point)	±0.008 degree/°C (typ.)	-
Operating temperature	from -20 to +70 °C	-
CAN bus interface	1	ON request
RS-232 interface	1 for calibration and diagnostic	AMP Superseal 1.5 series 3P connector (282105-1)
Maximum weight	0.40 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP66 / IP67	-
CE Conformity	EMC Directive: 2014/30/EU	-
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	-
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

Ordering Code

1	2	3	4	5	6	7
Outriggers auto-leveling system	Output 1	Output 2	Leveling procedure	Stabilizer feet lifting	Operating mode	CAN communication
GP200 MkII	P2	L2	ST1	LEG1	PP0	CAN0

1

Outriggers auto-leveling system	
GP200 MkII	Outriggers auto-leveling system

2

Output 1	
P2	Active (Vbat) when all stabilizer feet are in touch on the ground and the machine is leveled

3

Output 2	
L2	Active (Vbat) when the machine is leveled

4

Leveling procedure	
ST1	Leveling procedure available only if all feet have been lifted off the ground at least once. (Selectable via configuration software)

5

Stabilizer feet lifting	
LEG1	Lifting of stabilizer feet always available. (Selectable via configuration software)

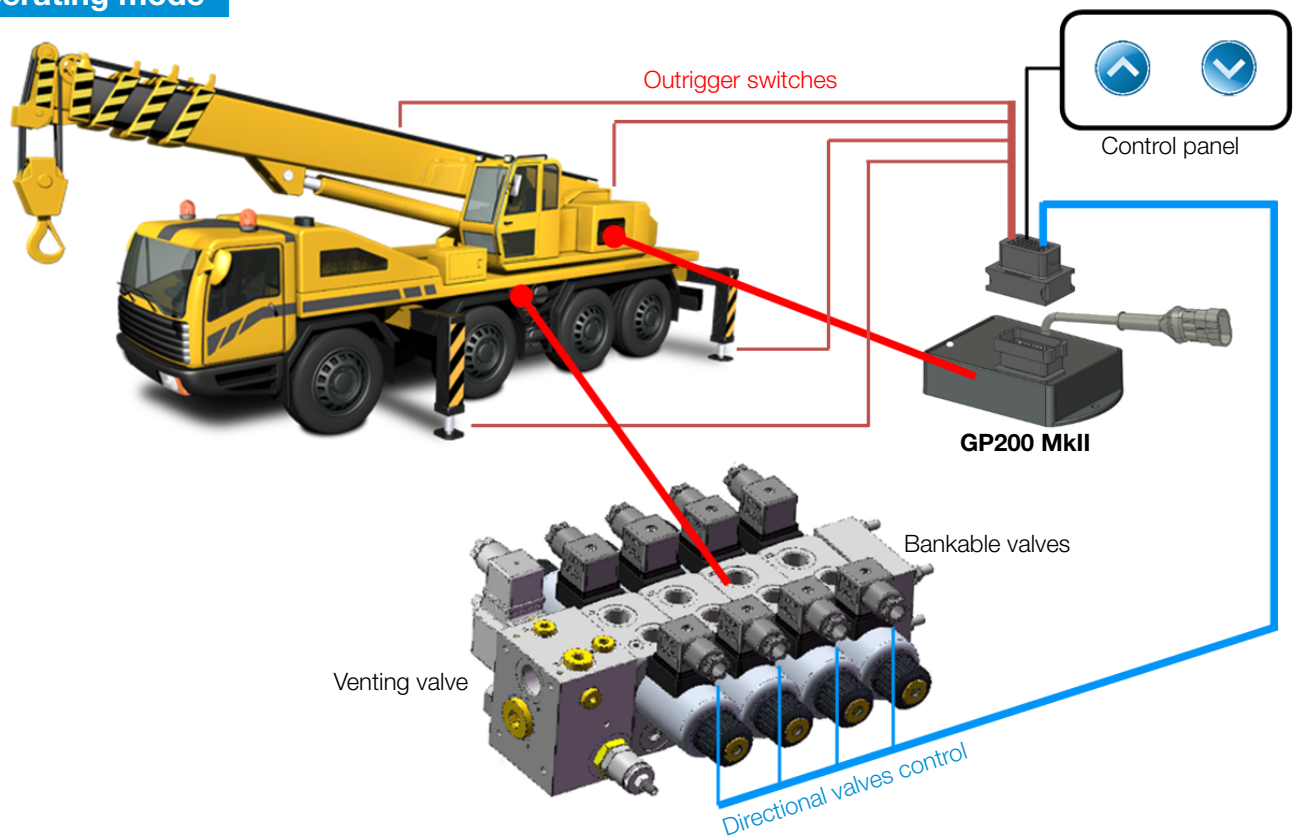
6

Operating mode	
PP0	Leveling behavior after loss of contact of at least one foot during self-leveling: proceeds in self-leveling. (Selectable via configuration software)

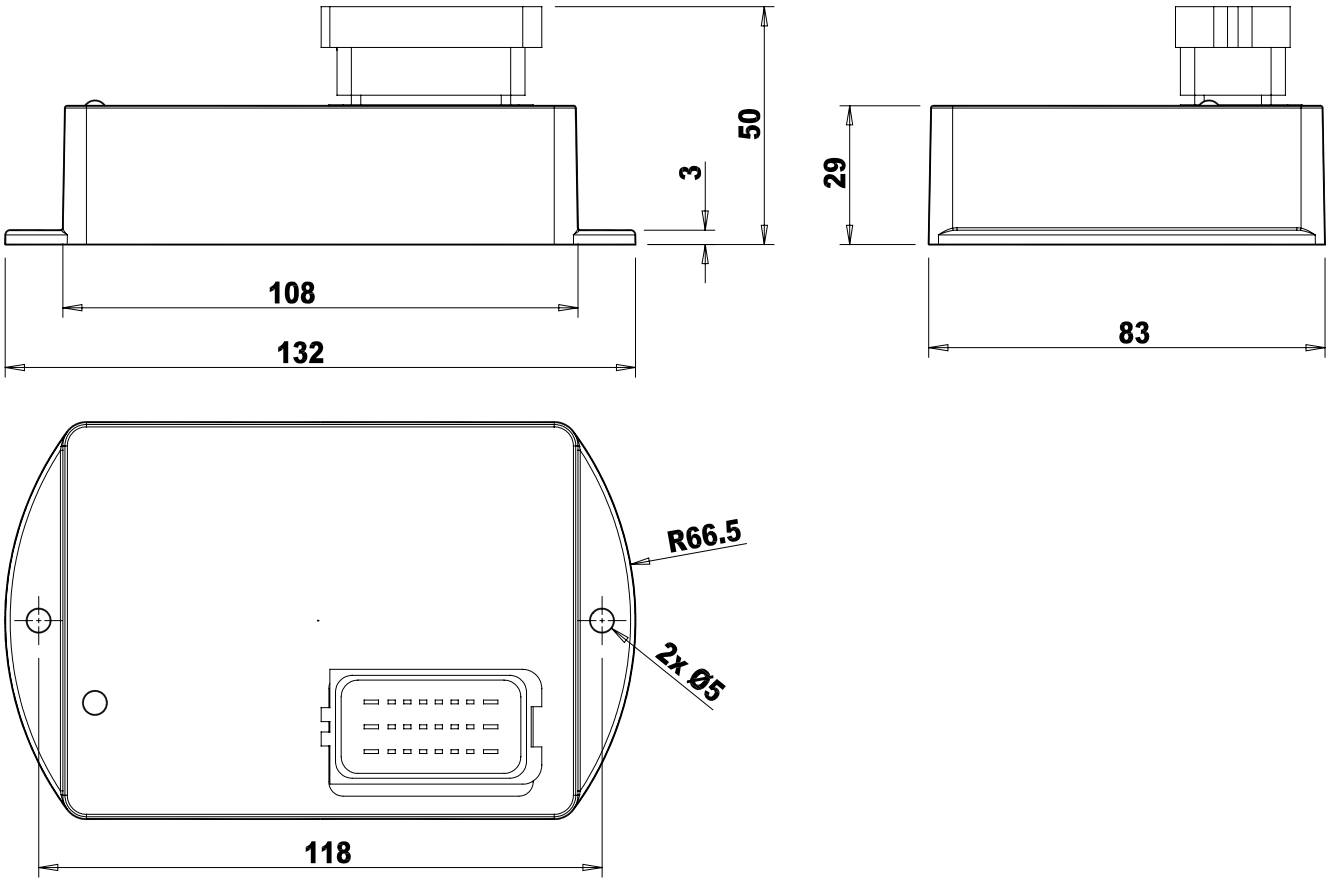
7

CAN communication	
CAN0	1 CAN bus channel
CAN1	Not available

Operating mode



Dimensions [mm]



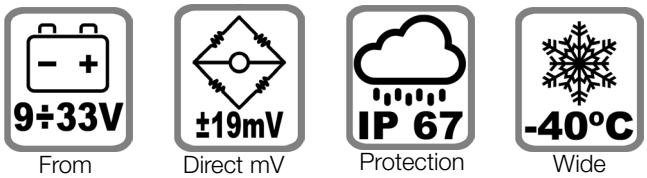
General features

- Percentage indication through a 3 colors and 8 LEDs bar
- Inputs for one or two amplified transducers (4 to 20 mA or 0.5 to 4.5 VDC) or an extensimetric transducer
- Green LED for power supply indication
- Same power supply for 12/24 VDC systems
- Outputs for alarm and pre-alarm signalling
- PL b (EN 13849-1) alarm safety output (for “O1P” option only, see Ordering Code)
- Digital input to select between two alarm levels
- Zero and maximum level calibration
- Waterproof, plastic, compact body (40% fiber glass reinforced PBT)
- Electrical connection with MATE-N-LOK connectors (counterparts provided)

On request:
- RS-232 serial connection

Typical fields of application:
generic mobile machines.

Note:
The user/installer is responsable for evaluating the values and, thus, the safety of the application



From 9 to 33 VDC | Direct mV analog inputs | Protection Grade IP67 | Wide temperature range

Technical Data

Power supply	9 to 33 VDC	Protected against polarity inversion
Analog inputs	two 4 to 20 mA(1) or 0.5 to 4.5 VDC or one differential type	Protected against short circuits and operator errors. RSHUNT = 200 Ohm [1] (for 4 to 20 mA inputs only)
Digital inputs	1	-
Digital outputs	2	Positive. IMAX = 3 A. Protected against short circuits
Operating temperature	from -40 to +70 °C	-
Maximum weight	0.25 kg	-
Housing material	40% fiberglass reinforced PBT	-
Coating	Two components polyurethane	-
Standard protection grade	IP67	-
CE Conformity	EMC Directive: 2014/30/EU	
EMC: Immunity | Emission	EN 61000-6-2, EN61000-6-3	Heavy industrial
Vibration resistance: Sinus	EN 60068-2-6: 5 g, 10 to 150 Hz	-
Shock resistance: Shock	EN 60068-2-27: 30 g, 6 ms	-
MTTFd	EN 13849-1: ≥ 100 years	-

[1] When two wires 4 to 20 mA transducers are used, check that resulting power supply is enough to power on the transducers

Ordering Code

1	2	3	4	5	6
Display type	Analog input	Alarm level	Alarm output	Pre-Alarm output	Box
VPL	_1TD	_1	O1P	O1P	S

1	
Display type	
VPL	Percentage LED digital indicator

2	
Analog input	
_1TD	One strain gauge transducer
1TXV	One 0.5 to 4.5 VDC signal transducer
2TXV	Two 0.5 to 4.5 VDC signal transducer
1TXA	One 4 to 20 mA signal transducer
2TXA	Two 4 to 20 mA signal transducer

3	
Alarm level	
_1	One alarm level
_2	Two alarm level

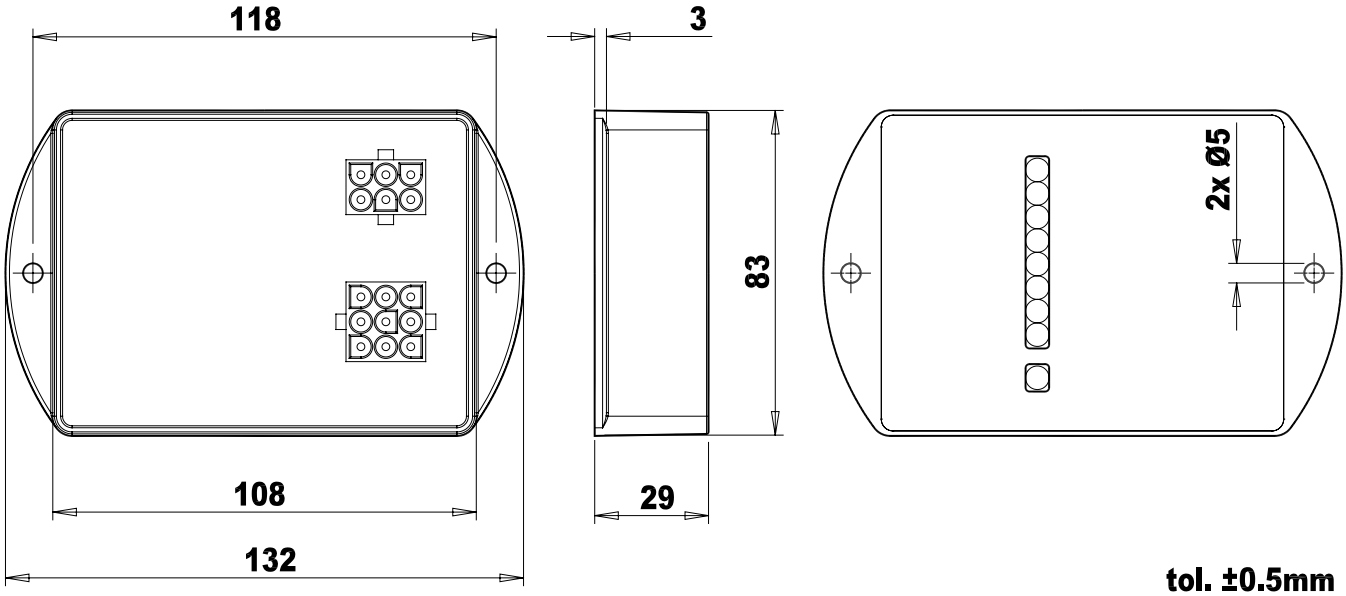
4	
Alarm output	
NOT	No alarm output
O1P	One positive logic alarm output (safety level: PL b)
O1N	One negative logic alarm output (safety level: none)

5	
Pre-Alarm output	
NOT	No pre-alarm output
O2P	One positive logic pre-alarm output
O2N	One negative logic pre-alarm output

6	
Box	
S	With standard box

Custom configuration are available on request

Dimensions [mm]



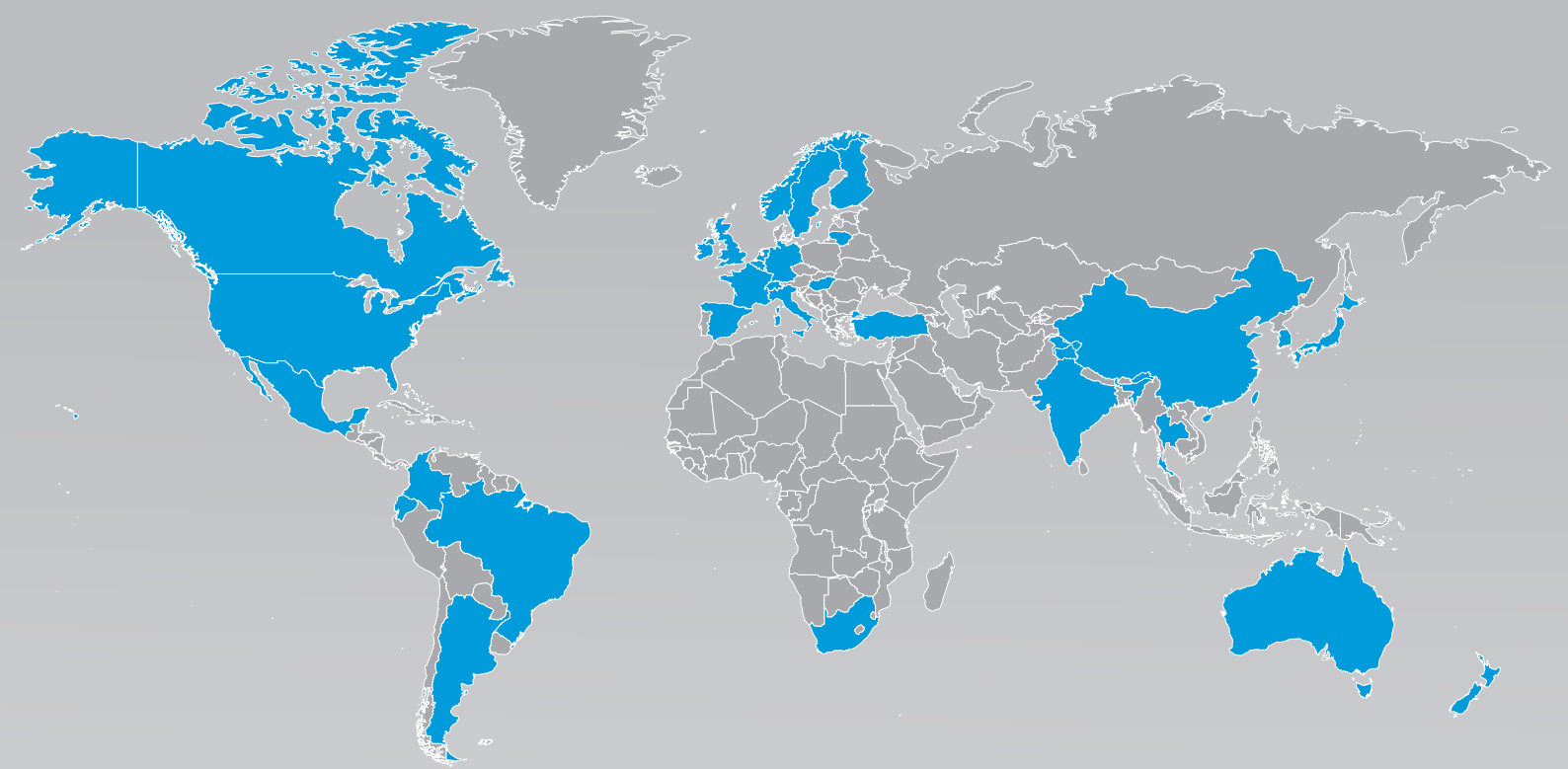
tol. ±0.5mm

Accessories

Type	Description
Counterpart Connector kit	AMP MATE-N-LOK 9 pin plug connector composed by: • 1 loose connector 9 pin; • 9 female terminals; • 1 wire Seal; • 1 interface Seal
Serial connection cable	RS-232 serial cable to connect a PC (DB9 connector) to VPL board (AMP Mate-n-Lok 6 pins connector) L=4 m
USB adapter	USB/RS-232 DB9 adapter

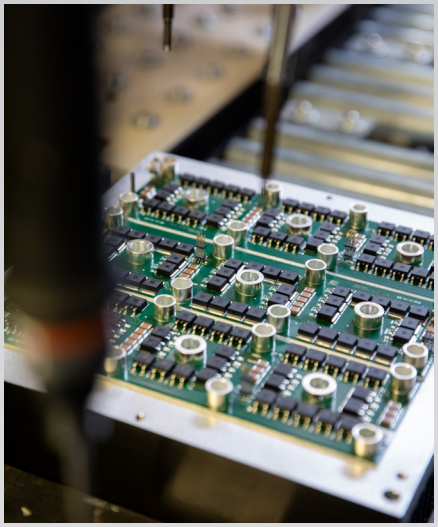
DANA
BREVINI®
Motion Systems

NOTES



Technologies Customized to **Every Part of the Globe**

With a presence in 31 countries, Dana Incorporated boasts more than 150 engineering, manufacturing, and distribution facilities. Our worldwide network of local service centers provides assurance that each customer will benefit from the local proximity and responsiveness.



About Dana Incorporated

Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded in 1904, we employ thousands of people across six continents.

About Dana Off-Highway Drive and Motion Systems

Dana delivers fully optimized Spicer® drivetrain and Brevini® motion systems to customers in construction, agriculture, material-handling, mining, and industrial markets. We bring our global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

Learn more about Dana's drivetrain and motion systems at **dana.com/offhighway**.

Dana-Industrial.com

Application Policy
Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana; contact your representative for application approval. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.

DANA

BREVINI®
Motion Systems