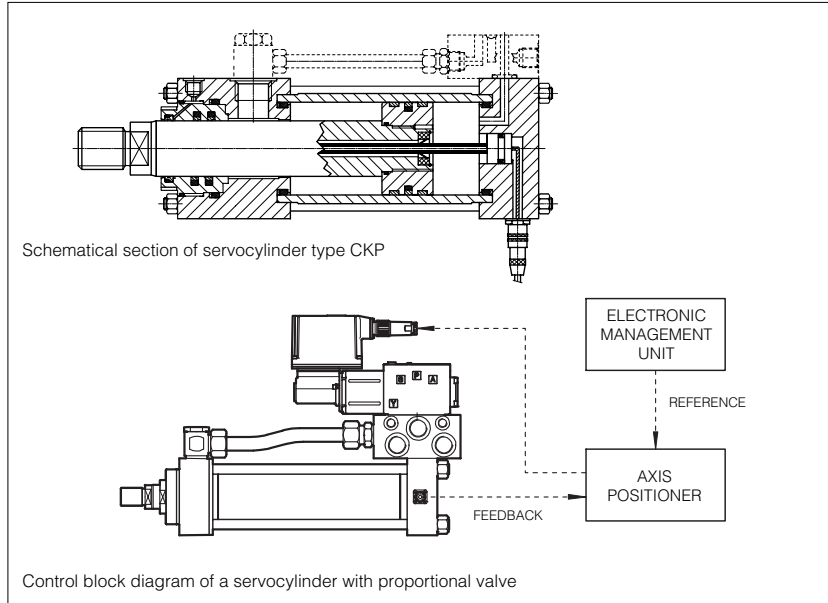


Servocylinders type CK* with built-in transducer

ISO 6020-2 - DIN 24554, AFNOR NFE 48-016

double acting - nominal pressure 160 bar - maximum pressure 250 bar



CK* electrohydraulic servocylinders are double acting actuators, low friction execution with built-in electronic transducer for the rod position feedback. Their compact construction allows high flexibility for use in all applications. The transducer is well protected against shock or external dirt, and maintenance is reduced to a minimum.

- Derived from cylinders series CK according to ISO 6020-2 and DIN 24554, see tab. B137.
- Bore sizes from Ø 40 to Ø 200 mm.
- Standard strokes on request.
- Potentiometric, inductive, magnetosonic transducers, see section 1, 2, 3, 4, 5, 6, 7.
- As a standard: rod side drain, double rod seal, air bleeds on the heads.

See section 14 for on-board on/off valves or proportional valves in order to allow the maximum hydraulic strenght of the system, fast response time, a better repeatability and regulation precision.

1 MAIN CHARACTERISTICS OF TRANSDUCERS, see section 3, 4, 5, 6, 7.

Code	CKP	CKV	CKF	CKM
Transducer type	Potentiometric	Inductive	Magnetosonic, analog	Magnetosonic, programmable
Linearity (1)	± 0,1%	± 0,1%	± 0,03%	± 0,01%
Ripeatability (1)	± 0,05%	± 0,05%	± 0,005%	± 0,001%
Max speed	0,5 m/s	1 m/s	1 m/s	2 m/s
Strokes	100, 200, 300, 400, 500, 700, 900	100 to 1000 (increments of 50)	100 to 1000 (increments of 100)	100 to 3000 (increments of 50)
Interface	Voltage 0 ÷ 10 V (typical)	Voltage: 0 ÷ 10V Current: 4 ÷ 20 mA	Voltage 0 ÷ 10 V	Analog: 0 ÷ 10 V; 4 ÷ 20 mA Digital: Serial SSI; Can-Bus; Profibus
Typical applications	Various, Compact construction	Simulators, compact construction	Sawing machines, various	Steel plants, Plastics
Temperature limits	-20°C to + 75°C	-30°C to + 75°C	-40°C to + 75°C	-40°C to + 75°C

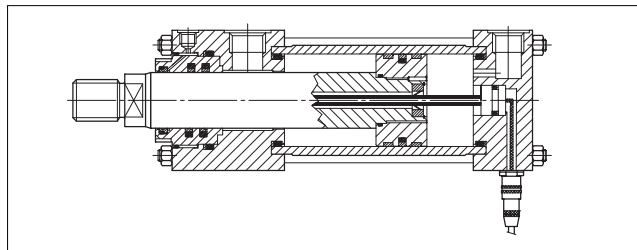
1) Percentage of the total stroke

2 MODEL CODE

CK	P - 10 - 50 / 36 *500- S	2 0 8	K 20																			
<p>Cylinder series CK = to ISO 6020-2 and DIN 24554 CH = Assembled with counterflanges (for Ø 63÷200 mm)</p> <p>Built-in transducer P = potentiometric V = inductive VRVT F = magnetosonic analogic M = magnetosonic programmable</p> <p>Built-in subplates - ISO 4401 interface; 00 = without subplate 10 = size 06 (CK* 40÷200) 20 = size 10 (CK* 40÷200) 30 = size 16 (CK* 80÷200) 40 = size 25 (CK* 125÷200) Characteristics and dimensions in section 14</p> <p>Bore diameter [mm] See section 8 and 11 for available dimensions</p> <p>Rod diameter [mm]. See section 8 and 11 for available dimensions For double rod executions see section 16</p> <p>Stroke [mm]. Select among the strokes indicated on section 3, 4, 5, 6, 7.</p> <p>Attachments, see section 10 and 13 for the compatibility with the transducers</p>	<p>RIF. ISO</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <table border="0"> <tr><td>X = basic execution</td><td>MP1</td></tr> <tr><td>C = female clevis</td><td>MP3</td></tr> <tr><td>D = male clevis</td><td>MS2</td></tr> <tr><td>E = feet</td><td>MT1</td></tr> <tr><td>G = front trunnion</td><td></td></tr> </table> </td> <td style="width: 50%; border: none;"> <table border="0"> <tr><td>L = mid-body trunnion</td><td>MT4</td></tr> <tr><td>N = front flange</td><td>ME5</td></tr> <tr><td>P = rear flange</td><td>ME6</td></tr> <tr><td>S = swivel with eye</td><td>MP5</td></tr> </table> </td> </tr> </table> <p>For other attachments, consult our technical office</p>	<table border="0"> <tr><td>X = basic execution</td><td>MP1</td></tr> <tr><td>C = female clevis</td><td>MP3</td></tr> <tr><td>D = male clevis</td><td>MS2</td></tr> <tr><td>E = feet</td><td>MT1</td></tr> <tr><td>G = front trunnion</td><td></td></tr> </table>	X = basic execution	MP1	C = female clevis	MP3	D = male clevis	MS2	E = feet	MT1	G = front trunnion		<table border="0"> <tr><td>L = mid-body trunnion</td><td>MT4</td></tr> <tr><td>N = front flange</td><td>ME5</td></tr> <tr><td>P = rear flange</td><td>ME6</td></tr> <tr><td>S = swivel with eye</td><td>MP5</td></tr> </table>	L = mid-body trunnion	MT4	N = front flange	ME5	P = rear flange	ME6	S = swivel with eye	MP5	<p>Design number It is important to indicate the design number in case spare parts are requested.</p> <p>Options - to be reported in alphabetical order: H = rod thread according to DIN 24554 - see section 8 and 11. K = NIKROM - provided on rods of Ø 28÷110 - saline mist resistance 350 hours to ISO 3768. For pressure over 100 bar consult our technical office. T = hardening and chrome plating For other characteristics see table B005. Only for servocylinders type CKM: I = current output electric signal (4÷20 mA) V = voltage output (0÷10V) S* = digital SSI output: see section 6 N* = fieldbus output: see section 7 For further information, see section 6 and 7</p> <p>Seals: 8 = (NITRILE + PTFE and POLIURETHAN) anti-friction, for speed up to 1 m/sec; for mineral oil and organic esters based fluids. 2 = (VITON + PTFE) anti-friction, for high fluid temperature, for speed up to 1 m/sec; for mineral oil, water-glycol and phosphate ester based fluids. 4 = (NITRILE + PTFE) anti-friction, for high speed up to 4 m/sec; for mineral oil, water-glycol and organic ester based fluids. For other characteristics, see table B005. Seals type 2 and 4 are not available for servocylinders type CKP.</p> <p>Spacers: 2 = 50 mm 4 = 100 mm 6 = 150 mm 8 = 200 mm See tab. B005 (section 5.4) for recommended dimensions according to the stroke</p> <p>Cushioning - Available for CK* 63÷200 only on the front head side 0 = without cushioning 2 = front cushioning For rear cushioning, consult our technical office.</p>
<table border="0"> <tr><td>X = basic execution</td><td>MP1</td></tr> <tr><td>C = female clevis</td><td>MP3</td></tr> <tr><td>D = male clevis</td><td>MS2</td></tr> <tr><td>E = feet</td><td>MT1</td></tr> <tr><td>G = front trunnion</td><td></td></tr> </table>	X = basic execution	MP1	C = female clevis	MP3	D = male clevis	MS2	E = feet	MT1	G = front trunnion		<table border="0"> <tr><td>L = mid-body trunnion</td><td>MT4</td></tr> <tr><td>N = front flange</td><td>ME5</td></tr> <tr><td>P = rear flange</td><td>ME6</td></tr> <tr><td>S = swivel with eye</td><td>MP5</td></tr> </table>	L = mid-body trunnion	MT4	N = front flange	ME5	P = rear flange	ME6	S = swivel with eye	MP5			
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3 SERVOCYLINDERS TYPE CKP

The potentiometric transducer consists of a resistance track and of a wiper which realizes the sliding contact on it. The resistive track is an aluminium element with a conductive plastic coating, fixed to the rear cylinder's head. The wiper is mounted on the piston rod and moves together with it. The two brushes of the wiper close the electrical circuit with the track, changing the resistance value and then the voltage output proportionally to its position (principle of potential divider). The advantages of the CKP servocylinder are the attractiveness and the compactness due to the fully integrated mounting of the transducer. This allows its easy application where a cylinder without any measuring system and with rear eye-swivel or clevis attachments has been already foreseen or mounted.



CHARACTERISTICS OF THE TRANSDUCER

CKP uses "Vishay" 's potentiometric transducers whose characteristics are shown on table 1.

Tab.1

Power supply	10 Vbc (typical)
Maximum power rating	0,3 W/cm at 25°C. 0 W at 125°C
Linearity	±0,1% F.S.
Repeatability	±0,05% F.S.
Total resistance	150 Ω/cm
Insulation resistance	> 1000 MΩ, 500 Vbc
Wiper current	1 mA max. Continuous recommended: a few μA
Temperature limits	-20 + 75°C
Connection type	4 Pin connector
Sealing	IP65
Standard strokes (mm)	100, 200, 300, 400, 500, 700, 900
Maximum speed	0,5 m/s

ELECTRICAL CONNECTOR

Male 4 PIN wall mount connector on the rear cylinder's head and straight female cable connector (included with delivery).

Wiring: see tab. 2

The connector is mounted on the side 4 of the rear head for all the cylinder's attachments, excepted for the "feet" type "E" (ISO MS2) where is mounted along the cylinder's axis. See sections 9 and 10.

SIZES, DIMENSIONS, ATTACHMENTS

See sections 8, 9, 10.

STROKES

Select among the standard strokes specified on tab. 1.

If a mechanical stroke intermediate respect of the standards is required, the servocylinder will be assembled using a transducer of the next standard stroke longer than the one requested, inserting if necessary suitable spacers to increase its length. In this case only a part of the transducer's full measuring range will be run (mechanical stroke of the cylinder and total electrical stroke of the transducer do not coincide), and thus it may be necessary to apply some "electrical devices" for an appropriate use of the feedback signal.

In all cases consult our technical office for non-standard strokes.

FLUIDS

Produced for use with hydraulic mineral oil, CKP are not suitable for use with water glycol.

Fluid recommended viscosity: 15 -100 Cst.

Fluid contamination rate: ISO 19/16.

Temperature: 0 + 75°C; consult our technical office for excess temperatures.

For compatibility with other fluids consult our technical office.

START-UP NOTES

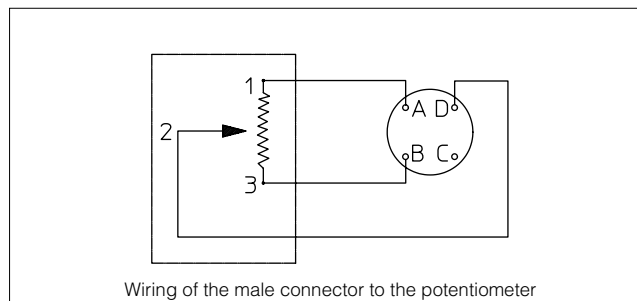
During the start-up it is necessary to bleed the air from the servocylinder by loosening the bleeding screws supplied as standard on the heads and by repeatedly acting the cylinder at a slow speed.

It's moreover necessary to fill with fluid the cavity of the rod where the transducer is placed, feeding the rear side of the cylinder with a flow rate lower than 10 l/min, and taking care to completely bleed the air from the inside (the compressibility effects of the air trapped in may compromise the contact between wiper and track); owing to this, a proper bleeding screw on the rod end, shown on tab.3, is supplied as standard.

During the pauses, avoid this cavity be empty.

The drain port (G 1/8"), supplied as standard too, have to be connected to the tank without counter-pressure; see tab. B005 (section 5.6).

Tab.2



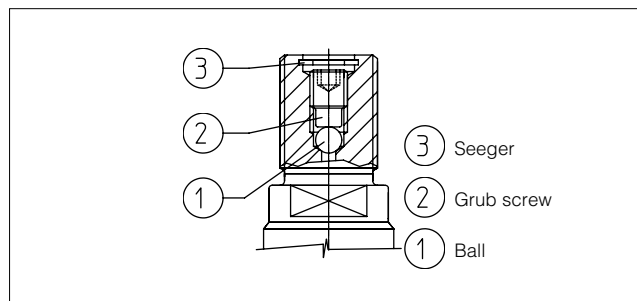
WARNINGS

For a correct functioning, the transducer must be exclusively used as a potential divider; in this way the variation of the resistance due to temperature does not influence the output values.

Different uses (i.e. resistance divider or other) reduce the performances or damage the component.

The power supply must be stabilized; variations on the voltage supply transmit on the output values.

Tab.3



4 SERVOCYLINDERS TYPE CKV

The inductive transducer type VRVT is composed of two coil-windings and of a ferromagnetic core. The coil-windings are integrated with a tube fixed to the rear cylinder's head; the core is fixed to the piston rod and moves together with it.

Changing the position of the rod and then of the core, the induced current on the secondary coil changes proportionally, being therefore a measurement of the actual position of the rod.

A proper signal processing card transforms this measurement into an analog output feedback signal.

The transducer does not have contact moving parts, a great advantage for its working life. Ruggedness and simplicity advise its use where high frequency vibrations or dynamical stresses are transmitted to the servocylinder (i.e. simulators, vibropresses etc.).

The compactness of the CKV due to the fully integrated mounting of the transducer allows its easy application where a cylinder without any measuring system and with rear eye-swivel or clevis attachments has been already foreseen or mounted

CHARACTERISTICS OF THE TRANSDUCER

CKV uses "Penny & Giles" 's VRVT inductive transducers whose characteristics are shown on table 1.

The performances of the transducer indicated on table 1 refer exclusively to the use with its proper conditioning card.

CONDITIONING CARD

Not included with the supply, have to be separately ordered.

Ordering code: SP-EM-10-I

The card provides analog outputs 0-10V / 4-20mA with the possibility to adjust the zero and the gain referements.

For other outputs, consult our technical office.

The card's format fits to DIN EN50022 or EN50035 rails.

Characteristics and dimensions: see tab. 3.

ELECTRICAL CONNECTOR

Male 4 PIN wall mount connector on the rear cylinder's head and straight female cable connector (included with delivery).

Wiring: see tab. 2

The connector is mounted on the side 4 of the rear head of all the cylinder's attachments, excepted for the "feet" type "E" (ISO MS2) where it is mounted along the cylinder's axis. See sections 9 and 10.

SIZES, DIMENSIONS, ATTACHMENTS

See sections 8, 9, 10.

STROKES

From 50mm to 1000mm by increments of 50mm.

For different strokes, contact our technical office.

If a mechanical stroke shorter than 50mm (or longer of an amount < 50 mm) is required, the servocylinder will be assembled using a transducer of the next standard stroke longer than the one requested, inserting if necessary suitable spacers to increase its length.

In this case only a part of the transducer's full measuring range will be run (mechanical stroke of the cylinder and total electrical stroke of the transducer do not coincide), and thus it may be necessary to apply some "electrical devices" for an appropriate use of the feedback signal. In all cases consult our technical office for non-standard strokes.

FLUIDS

Produced for use with hydraulic mineral oil, CKV can also be used with organic esters or phosphate esters based fluids or with water glycol, providing an appropriate selection of seals and a check of our technical office.

Fluid recommended viscosity: 15 -100 Cst.

Fluid contamination rate: ISO 19/16.

Temperature: 0 + 75°C; consult our technical office for excess temperatures.

START-UP NOTES

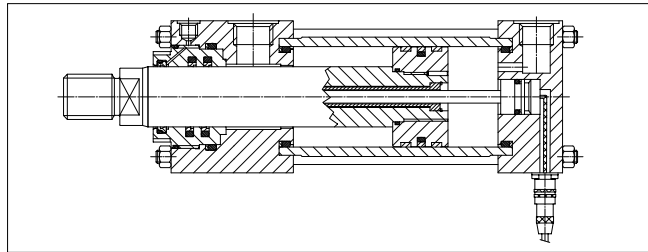
During the start-up it is necessary to bleed the air from the servocylinder by loosening the bleeding screws supplied as a standard on the heads and by repeatedly acting the cylinder at a slow speed.

The drain port (G 1/8"), supplied as a standard too, have to be connected to the tank without counter-pressure. See table B005 (section 5.6).

WARNINGS

Each CKV servocylinder is always delivered together with an electric module containing the setting and the calibration of the signal of the transducer inside mounted. This module must be coupled with the conditioning card, by its proper housing.

The maximum recommended distance between the servocylinder and the conditioning card is 30 m.



Tab.1

Linearity	±0,1% F.S.
Repeatability	±0,05 %F.S.
Insulation resistance	50 MΩ to 100 Vdc
Temperature coefficient	100 ppm/°C from +20 to +60°C
Operating temperature	-30 + 75°C
Connection type	4 Pin connector
Sealing	IP65
Measuring range	from 50 to 1000 mm (increments of 50 mm)
Maximum speed	1 m/s (check the characteristic of the cylinder - tab. B137)

Tab.2

Male connector	PIN	OUTPUT
<p>Front external view</p>	A	+ Ve
	B	GROUND
	C	-
	D	- Ve

Tab.3

Supply voltage	from 18 to 30 Vdc
Supply current	<100 mA Max
Output	0÷10 Vdc e 4÷20 mA
Output adjustment	±10% span; 100% zero
Output ripple	<5mV RMS
Output load (current output)	700Ω max 24 Vdc supply; 1000Ω max 30 Vdc supply
(voltage output)	5000Ω min
Operating temperature	0+60°C (storage -20 +70 °C)
Temperature coefficient	<300 ppm/°C

5 SERVOCYLINDERS TYPE CKF

The magnetosonic transducer is composed of a metallic conductive waveguide fixed to the cylinder body and of a permanent magnet fixed to the cylinder rod.

An electric pulse runs at a constant speed along the waveguide. When its magnetic field crosses the permanent magnet's field, a magnetostrictive effect develops, producing a short-term elastic twist of the waveguide. This torsion pulse runs back and the time taken is proportional to the magnet position, being therefore a measurement of the actual position of the rod. Sensor integrated signal processing transforms this measurement into an output feedback signal.

The contactless principle of the transducer assures a long working life and allows its use even in hard environmental conditions (shocks, vibrations etc.) or high working frequencies.

The transducer can be replaced without disassembling the cylinder, providing a great advantage of easy and quick maintenance.

The electronic box is covered by a steel case which is screwed at the rear of the cylinder head to prevent shocks or mechanical damages.

This version of the magnetosonic transducer, particularly simple and cost-effective, makes the CKF servocylinders easy to apply especially as an alternative to external encoders or potentiometers.

AVAILABLE VERSIONS

The integrated electronic of the transducer supplies an analogic voltage $0 \div 10$ Vdc output.

For other outputs, consult our technical office.

CHARACTERISTICS OF THE TRANSDUCER

CKF uses "MTS" 's magnetosonic transducers whose characteristics are shown on table 1.

ELECTRICAL CONNECTOR

Male 6 PIN wall mount connector on the transducer head and straight female cable connector (included with delivery).

Wiring: see tab. 2.

SIZES, DIMENSIONS, ATTACHMENTS

See section [11](#), [12](#) and [13](#).

STROKES

From 100mm to 1000 mm by increments of 100 mm.

For different strokes, contact our technical office.

If a mechanical stroke shorter than 100 mm (or longer of an amount < 100 mm) is required, the servocylinder will be assembled using a transducer of the next standard stroke longer than the one requested, inserting if necessary suitable spacers to increase its length.

In this case only a part of the transducer's full measuring range will be run (mechanical stroke of the cylinder and total electrical stroke of the transducer do not coincide), and thus it may be necessary to apply some "electrical devices" for an appropriate use of the feedback signal. In all cases consult our technical office for non-standard strokes

FLUIDS

Produced for use with hydraulic mineral oil, CKF can also be used with organic esters or phosphate esters based fluids or with water glycol, providing an appropriate selection of seals and a check of our technical office.

Fluid recommended viscosity: 15 -100 Cst.

Fluid contamination rate: ISO 19/16.

Temperature: $0 \div 75^{\circ}\text{C}$; consult our technical office for excess temperatures.

START-UP NOTES

During the start-up it is necessary to bleed the air from the servocylinder by loosening the bleeding screws supplied as a standard on the heads and by repeatedly acting the cylinder at a reduced speed.

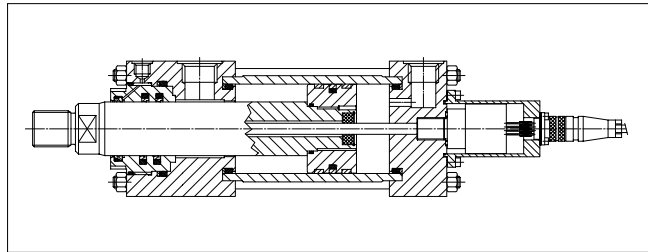
The drain port (G 1/8"), supplied as a standard too, have to be connected to the tank without counter-pressure; see table B005 (section 5.6).

WARNINGS

Ensure the servocylinder is kept away from strong magnetic and electrical noise-fields.

Ensure of the correct female cable connector wiring and its right coupling to the transducer before giving the power supply, to avoid electro-nical damagings due to voltage peaks or wrong connections.

Keep the connecting cable away from other power wires to prevent noises on the feedback signal.



Tab.1

Power supply	24 Vdc (+20% / -15%)
Output	$0 \div 10$ Vdc
Resolution	$< 0,2$ mm (stroke 1000 mm)
Linearity	$< \pm 0,03\%$ F.S (min ± 100 μm)
Repeatability	$< \pm 0,005\%$ F.S.
Output update frequency	1,5 KHz (strokes up to 500 mm)
Temperature coefficient	< 50 ppm/ $^{\circ}\text{C}$
Operating temperature	$-40 \div +75^{\circ}\text{C}$
Connection type	6 Pin connector M16
Sealing	IP67
Shock rating	100g (single hit) / IEC Standard 68-2-27
Vibration rating	5g/10 \div 150 Hz / IEC Standard 68-2-6
Measuring range	100 to 1000 mm (increments of 100 mm)
Maximum speed	1m/s (check the characteristic of the cyl. - tab B137)

Tab.2

6 PIN female connection	PIN	OUTPUT
	1	$0-10$ V
	2	DC Ground
	3	-
	4	-
	5	+24 Vdc (+20% / -15%)
	6	DC Ground (0V)

6 SERVOCYLINDERS TYPE CKM analog and digital SSI

The magnetosonic transducer is composed of a metallic conductive waveguide fixed to the cylinder body and of a permanent magnet fixed to the cylinder rod.

An electric pulse runs at a constant speed along the waveguide. When its magnetic field crosses the permanent magnet's field, a magnetostrictive effect develops, producing a short-term elastic twist of the waveguide. This torsion pulse runs back and the time taken is proportional to the magnet position, being therefore a measurement of the actual position of the rod. Sensor integrated signal processing transforms this measurement into an output feedback signal.

The contactless principle of the transducer assures a long working life and allows its use even in hard environmental conditions (shocks, vibrations etc.) or high working frequencies.

The complete transducer can be replaced without disassembling the cylinder, providing a great advantage of easy and quick maintenance. Besides, the only electronic head can be easily removed and separately replaced from its pressure-resistant sensor housing, by which the cylinder is hydraulically sealed. So the cylinder could keep on working avoiding production-stop time.

The CKM servocylinder is distinguished for the high performances and flexibility due to the several available versions.

AVAILABLE VERSIONS

The integrated electronic of the transducer can supply several kinds of outputs. The suffix related to the selected output signal must always be indicated in the model code of the servocylinder:

Analog

V = 0-10 V
I = 4-20 mA

Digital SSI

S1 = Binary 24 bit
S2 = Binary 25 bit
S3 = Gray 24 bit
S4 = Gray 25 bit

For other outputs, consult our technical office.

The transducer is also available with an explosion-proof housing, ATEX EEx approved, for use in explosion-hazardous environments. Consult our technical office for characteristics and possibility

CHARACTERISTICS OF THE TRANSDUCER

CKM uses "MTS" 's magnetosonic transducers whose characteristics are shown on table 1. Other types are even possible by a previous check of our technical office.

ELECTRICAL CONNECTOR

Male wall mount connector on the transducer head and straight female cable connector (included with delivery).

Wiring: see tab. 2

For other connector types or cable output, consult our technical office.

PROGRAMMING AND MONITORING

The output signal of the CKM's analog versions, is programmable: the zero/span references (start/end position) can be adjusted along all the active stroke length (min. increment 25 mm), and the measuring direction (forward/reverse acting) changed, by using proper programming tools to be separately ordered.

For digital versions a programming box can be ordered to be connected with a PC (the software is included) that allows to do both the functional test and the complete re-programming of the sensor parameters (resolution, output format and length etc.).

On the electronic transducer's head there are two LED that indicate its status, allowing a quick recognition of the working modes and the trouble-shooting.

Consult our technical office for further details.

SIZES, DIMENSIONS, ATTACHMENTS

See sections 11, 12 and 13.

STROKES

From 50 mm to 3000 mm by increments of 50 mm.

For longer strokes, consult our technical office.

If a mechanical stroke shorter than 50 mm (or longer of an amount < 50 mm) is required, the servocylinder will be assembled using a transducer of the next standard stroke longer than the one requested, inserting if necessary suitable spacers to increase its length. In this case only a part of the transducer's full measuring range will be run (mechanical stroke of the cylinder and total electrical stroke of the transducer do not coincide). On the analog versions we provide for the output re-programming, to set the zero/span values to the cylinder's mechanical stroke ends.

In all cases consult our technical office for non-standard strokes.

FLUIDS

Produced for use with hydraulic mineral oil, CKM can also be used with organic esters or phosphate esters based fluids or with water glycol, providing an appropriate selection of seals and a check of our technical office.

Fluid recommended viscosity: 15 -100 Cst.

Fluid contamination rate: ISO 19/16.

Temperature: 0 ÷ 75°C; consult our technical office for excess temperatures.

START-UP NOTES

During the start-up it is necessary to bleed the air from the servocylinder by loosening the bleeding screws supplied as a standard on the heads and by repeatedly acting the cylinder at a slow speed.

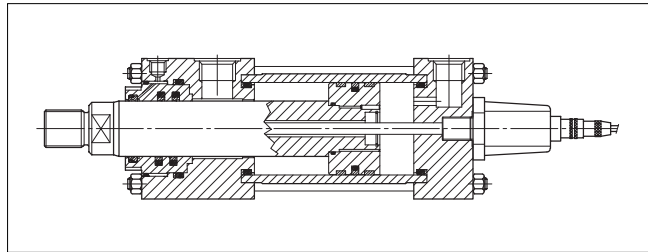
The drain port (G 1/8"), supplied as a standard too, have to be connected to the tank without counter-pressure; see table B005 (section 5.6).

WARNINGS

Ensure the servocylinder is kept away from strong magnetic and electrical noise-field.

Ensure of the correct female cable connector wiring and its right coupling to the transducer before the power supplying, to avoid electrical damagings due to voltage peaks or wrong connections.

Keep the connecting cable away from other power wires to prevent noises on the feedback signal.



Tab.1	ANALOG	DIGITAL SSI
Power supply	24 Vdc (+20% / -15%)	
Outputs	0÷10 Vdc/ 4÷20 mA	SSI RS 422/485 Standard
Data format (SSI)		Binary / Gray
Data length (SSI)		24/25 bit
Resolution	16 bit; 0,0015% (min 10 µm)	1 µm
Linearity	<±0,01% F.S. (min ±50 µm)	<±0,01% F.S. (min ±40 µm)
Repeatability	<±0,001% F.S. (min ±2,5 µm)	
Hysteresis	< 4 µm	
Output updated frequency	2,3 KHz (strokes up to 1000 mm)	2,3 KHz (strokes up to 1000 mm)
Temperature coefficient	< 30 ppm/°C	< 15 ppm/°C
Connection type	Connector 6 pin M16	Connector 7 pin M16
Shock rating	100g (single hit) / IEC Standard 68-2-27	
Vibration rating	15g/10÷2000 Hz / IEC Standard 68-2-6	
Sealing	IP67	
Operating temperature	-40 ÷ +75 °C	
Measuring range	50 to 3000 mm (increments 50 mm)	
Maximum speed	2m/s (check the characteristic of the cyl. - tab. B137)	

Tab.2

ANALOG CKM

6 PIN female connector	PIN	OUTPUT
<p>Internal view (welds side)</p>	1	0-10 V / 4-20 mA
	2	DC Ground
	3	-
	4	-
	5	+24 Vdc (+20% / -15%)
	6	DC Ground (0V)

DIGITAL SSI CKM

7 PIN female connector	PIN	OUTPUT
<p>Internal view (welds side)</p>	1	Data (-)
	2	Data (+)
	3	Clock (+)
	4	Clock (-)
	5	+24 Vdc (+20% / -15%)
	6	DC Ground (0V)
	7	-

7 SERVOCYLINDERS TYPE CKM Profibus-DP and CANopen

The magnetosonic transducer of CKM servocylinders (see note 6 for its working principle) is also available with fieldbus communication protocol outputs. Field communication networks, usually called fieldbus, allow to exchange a great amount of data among all the devices installed on the machines and industrial plants (servocylinders, valves, pumps, motors, etc.) by the use of just one cable to transmit them toward the controller and backward, avoiding therefore point-to-point connections and their expensive wiring and start-up costs. The remarkable aspect of these communication networks is the common standardized language ("protocol") of all the connected devices, making the control and monitoring of the whole machine easier.

AVAILABLE VERSIONS

There are several fieldbus protocols, two of these most commonly used. The suffix related to the protocol selected must always be indicated in the model code of the servocylinder:

- N1 = Profibus-DP** according to EN 50 170 (ISO 74498)
- N2 = CANopen** according to CiA standard DS-301 V4.02 (ISO-DIS11898)

For other types (CANbasic, DeviceNet, INTERbus etc.), consult our technical office.

The transducer is also available with an explosion-proof housing ATEX EEx approved for its use in explosion-hazardous environments. Consult our technical office for characteristics and possibility.

CHARACTERISTIC OF THE TRANSDUCER

CKM uses "MTS" 's magnetosonic transducers whose characteristics are shown on table 1. Other types are even possible by a previous check of our technical office.

ELECTRICAL CONNECTIONS

Connectors and wirings: see tab. 2 and 3. For other types of connection, consult our technical office.

INITIALIZING AND MONITORING

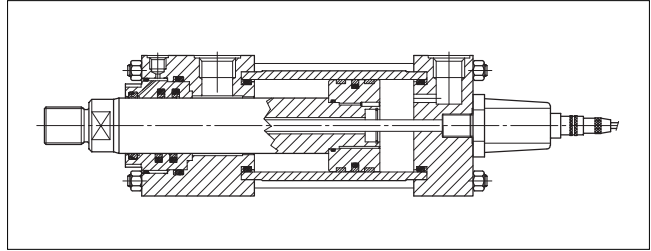
Each CKM fieldBus servocylinder is always delivered together with a floppy disk including all the data to initialize the transducer. Normally the setup of the transducer's slave address is done by the bus standard service. If the master bus system does not support this service, the setting can be done by a programmer tool to be connected to the transducer (to be separately ordered). On the transducer's electronic head there are two LED that indicate its status, allowing a quick recognition of the working modes and the trouble-shooting. Consult our technical office for further details.

SIZES, DIMENSIONS, ATTACHMENTS

See sections 6, 11, 12 and 13.

FLUIDS, WARNINGS, START-UP NOTES

See section 6.



Tab.1

Power supply	24 Vdc (+20% / -15%)
Data transmission rate (with cable L < 25 m and 1 node)	Profibus-DP: Max. 12 MBit/s CAN open: Max. 1000 KBit/s
Cycle time	1 ms with stroke up to 2000 mm
Resolution (selectable by Bus)	Max 2 µm (5 µm default value)
Linearity	<±0,01% F.S. (min ±50 µm)
Repeatability	<±0,001% F.S. (min ±2,5 µm)
Hysteresis	< 4 µm
Temperature coefficient	< 15 ppm/°C
Shock rating	100g (single hit) / IEC Standard 68-2-27
Vibration rating	15g/10-2000 Hz / IEC Standard 68-2-6
Connector sealing	IP67
Operating temperature	-40 +75 °C
Measuring range	50 to 3000 mm (increments of 50 mm)
Maximum speed	2m/s (check the characteristic of the cyl. - tab. B137)

Tab.2

CKM CANopen

	<p>Male wall mount connectors</p> <p>front external view</p>	PIN	OUTPUT	CABLE CONNECTORS (included with delivery)
		1	CAN (-)	n° 2 6 Pin female connectors
		2	CAN (+)	
		3	-	
		4	-	
		5	+24 Vdc (-15 / +20%)	
		6	0 V (GND)	

Tab.3

CKM PROFIBUS-DP

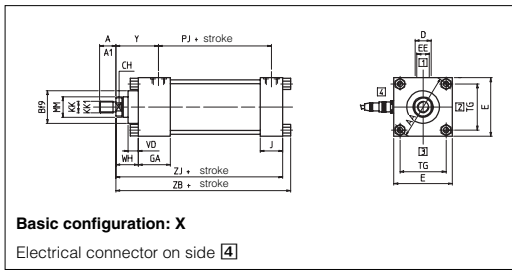
	<p>Wall mount connectors</p> <p>front external view</p> <p>front external view</p>	PIN	OUTPUT	CABLE CONNECTORS (included with delivery)
		1	VP+5 (BUS termination)	n° 1 5 Pin male connector
		2	RxD/TxD-N (BUS)	n° 1 5 Pin female connector
		3	DGND (BUS termination)	n° 1 BUS endplug 5 Pin
		4	RxD/TxD-P (BUS)	n° 1 4 Pin female connectors
		5	Schields	
		1	+24 Vdc (-15 / +20%)	
		2	-	
		3	0 V (GND)	
		4	-	

8 INSTALLATION DIMENSIONS [mm] FOR SERVOCLINDERS TYPE CKP, CKV

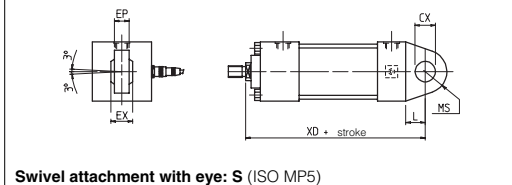
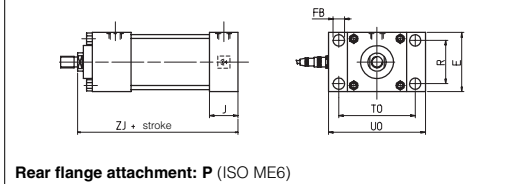
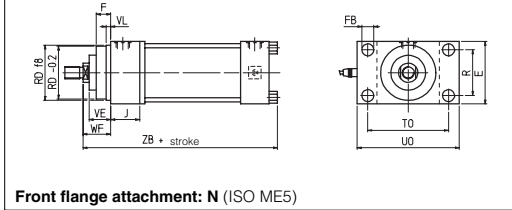
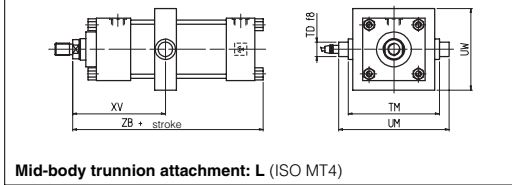
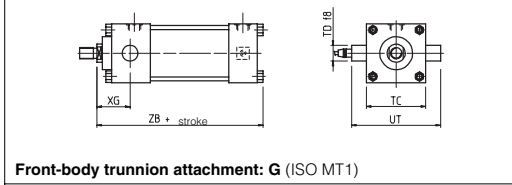
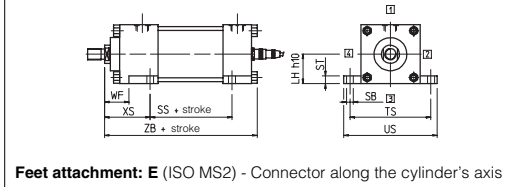
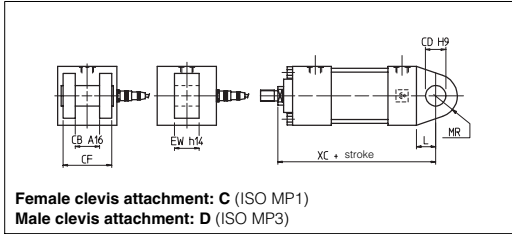
Ø PISTON	40	50	63	80	100	125	160	200	
Ø ROD	28	36	45	56	70	90	110	140	
A	28	36	45	56	63	85	95	112	
A1 (suff. H)	—	—	—	36	45	56	63	85	
AA	59	74	91	117	137	178	219	269	
B f9	42	50	60	72	88	108	133	163	
CB A16	20	30	30	40	50	60	70	80	
CD	14	20	20	28	36	45	56	70	
CF	40	60	60	80	100	120	140	160	
CH	22	30	39	48	62	80	100	128	
CX	value	20	25	30	40	50	60	80	100
	tolerance	0 -0,012			0 -0,015		0 -0,02		
D (DIN3654-4)	25	29	29	36	36	42	42	52	
E	63	75	90	115	130	165	205	245	
EE (GAS)	3/8"	1/2"	1/2"	3/4"	3/4"	1"	1"	1 1/4"	
EP	13	17	19	23	30	38	47	57	
EW h14	20	30	30	40	50	60	70	80	
EX	16	20	22	28	35	44	55	70	
F	10	16	16	20	22	22	25	25	
FB H13	11	14	14	18	18	22	26	33	
GA	55	61	61	70	72	80	83	101	
J	38	38	38	45	45	58	58	76	
KK	M20x1,5	M27x2	M33x2	M42x2	M48x2	M64x3	M80x3	M100x3	
KK1 (suff. H)	—	—	—	M27x2	M33x2	M42x2	M48x2	M64x2	
L	19	32	32	39	54	57	63	82	
LH	31	37	44	57	63	82	101	122	
LT min	25	31	38	48	58	72	92	116	
MR max	17	29	29	34	50	53	59	78	
MS max	29	33	40	50	62	80	100	120	
MT (tightening in Nm)	20	70	70	160	160	460	820	1160	
R	41	52	65	83	97	126	155	190	
RD	62	74	88	105	125	150	170	210	
SB	11	14	18	18	26	26	33	39	
ST	12,5	19	26	26	32	32	38	44	
TC	63	76	89	114	127	165	203	241	
TD	20	25	32	40	50	63	80	100	
TG	41,7	52,3	64,3	82,7	96,9	125,9	154,9	190,2	
TM	76	89	100	127	140	178	215	279	
TO	87	105	117	149	162	208	253	300	
TS	83	102	124	149	172	210	260	311	
UM	108	129	150	191	220	278	341	439	
UO max	110	130	145	180	200	250	300	360	
US	103	127	161	186	216	254	318	381	
UT	95	116	139	178	207	265	329	401	
UW	70	88	98	127	141	168	205	269	
VD	12	9	13	9	10	7	7	7	
VE	22	25	29	29	32	29	32	32	
VL	3	4	4	4	5	5	5	5	
WF	35	41	48	51	57	57	57	57	
WH	25	25	32	31	35	35	32	32	
XG	57	64	70	76	71	75	75	85	
XS	45	54	65	68	79	79	86	98	
minimum stroke for execution CH	-	-	150	150	200	200	300	300	
minimum stroke for execution with L att.	19	27	41	48	51	71	94	92	
XV min	96	107	119	127	143	155	162	190	
XV max	99+stroke	100+stroke	104+stroke	119+stroke	122+stroke	135+stroke	140+stroke	165+stroke	
Y	62	67	71	77	82	86	86	98	
add stroke and spacers	PJ	85	74	80	93	101	117	165	
	SS	110	92	86	105	102	131	172	
	XC	184	191	200	229	257	289	381	
	XO	190	190	206	238	261	304	415	
	ZB max	178	176	185	212	225	260	279	336
ZJ	165	159	168	190	203	232	245	299	

- **XV** - for attachment L: XV value must be between **XV min** and **XV max**, and it must be always indicated together with the model code. For executions with attachment L, if the stroke is shorter than the minimum value, shown in the table, proper spacers with the associated oversizing must be inserted.
- **FEMALE THREAD** on the rod end and **ENLARGED OIL PORTS** - consult our technical office
- Execution CH not provided for attachments **L** and **C**.
- For further information, please consult table B137.

9 BASIC CONFIGURATION



10 ATTACHMENTS FOR SERVOCYLINDERS TYPE CKP, CKV

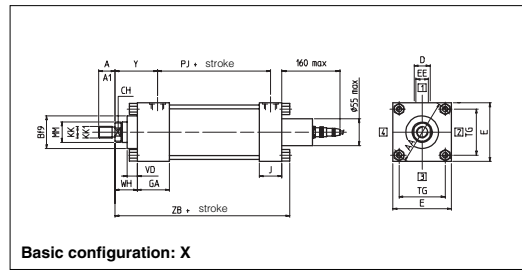


11 INSTALLATION DIMENSIONS [mm] FOR SERVOCLINDERS TYPE CKF, CKM

Ø PISTON	40	50	63	80	100	125	160	200
Ø ROD	28	36	45	56	70	90	110	140
A	28	36	45	56	63	85	95	112
A1 (suff. H)	18	22	28	36	45	56	63	85
AA	59	74	91	117	137	178	219	269
B f9	42	50	60	72	88	108	133	163
BB	35	46	46	59	59	81	92	115
BG min	12	18	18	24	24	27	32	40
CH	22	30	39	48	62	80	100	128
DD	M8x1	M12x1,25	M12x1,25	M16x1,25	M16x1,25	M22x1,5	M27x2	M30x2
D	25	29	29	36	36	42	42	52
E	63	75	90	115	130	165	205	215
EE (GAS)	3/8"	1/2"	1/2"	3/4"	3/4"	1"	1"	1 1/4"
F	10	16	16	20	22	22	25	25
FB H13	11	14	14	18	18	22	26	33
GA	55	61	61	70	72	80	83	101
KK	M20 x 1,5	M27 x 2	M33 x 2	M42 x 2	M48 x 2	M64 x 3	M80 x 3	M100 x 3
KK1 (suff. H)	M14 x 1,5	M16 x 1,5	M20 x 1,5	M27 x 2	M33 x 2	M42 x 2	M48 x 2	M64 x 3
LH	31	37	44	57	63	82	101	122
MT (tightening in Nm)	20	70	70	160	160	460	820	1160
R	41	52	65	83	97	126	155	190
RD	62	74	88	105	125	150	170	210
RT	M8x1,25	M12x1,75	M12x1,75	M16x2	M16x2	M22x2,5	M27x3	M30x3,5
SB	11	14	18	18	26	26	33	39
ST	12,5	19	26	26	32	32	38	44
TC	63	76	89	114	127	165	203	241
TD	20	25	32	40	50	63	80	100
TG	41,7	52,3	64,3	82,7	96,9	125,9	154,9	190,2
TM	76	89	100	127	140	178	215	279
TO	87	105	117	149	162	208	253	300
TS	83	102	124	149	172	210	260	311
UM	108	129	150	191	220	278	341	439
UO max	110	130	145	180	200	250	300	360
US	103	127	161	186	216	254	318	381
UT	95	116	139	178	207	265	329	401
UW	70	88	98	127	141	168	205	269
VD	12	9	13	9	10	7	7	7
VE	22	25	29	29	32	29	32	32
VL	3	4	4	4	5	5	5	5
WF	35	41	48	51	57	57	57	57
WH	25	25	32	31	35	35	32	32
XG	57	64	70	76	71	75	75	85
XS	45	54	65	68	79	79	86	92
minimum stroke for execution CH	-	-	150	150	200	200	300	300
minimum stroke for execution with L att.	19	27	41	48	51	71	94	96
XV min	96	107	119	127	143	155	162	190
XV max	99+stroke	100+stroke	104+stroke	119+stroke	122+stroke	135+stroke	140+stroke	165+stroke
Y	62	67	71	77	82	86	86	98
add stroke and spacers	PJ	85	74	80	93	101	117	165
	SS	110	92	86	105	102	131	172
	ZB max	178	184	192	212	225	260	336

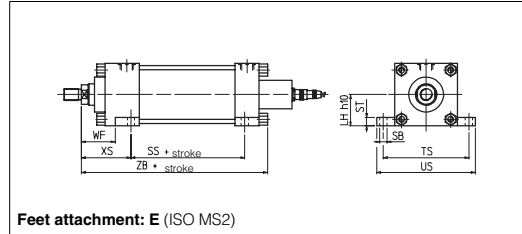
- **XV** - for attachment L: XV value must be between **XV min** and **XV max**, and it must be always indicated together with the model code. For executions with attachment L, if the stroke is shorter than the minimum value, shown in the table, proper spacers with the associated oversizing must be inserted.
- **FEMALE THREAD** on the rod end and **ENLARGED OIL PORTS** - consult our technical office
- Execution CH not provided for attachments **L**, **Y** and **Z**.
- For further information, please consult table B137.

12 BASIC CONFIGURATIONS

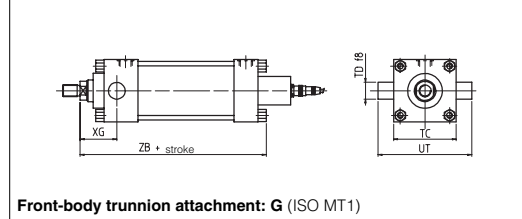


Basic configuration: X

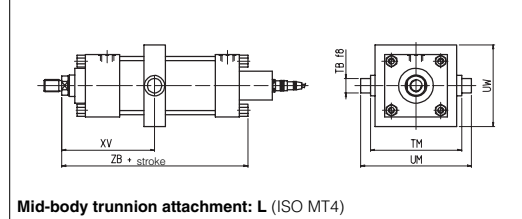
13 ATTACHMENTS FOR SERVOCYLINDERS TYPE CKF, CKM



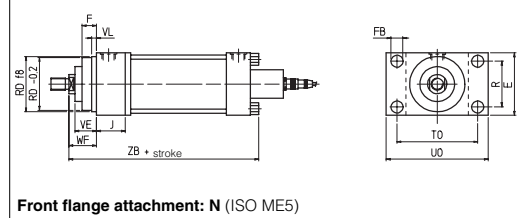
Feet attachment: E (ISO MS2)



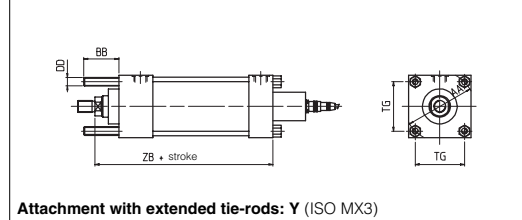
Front-body trunnion attachment: G (ISO MT1)



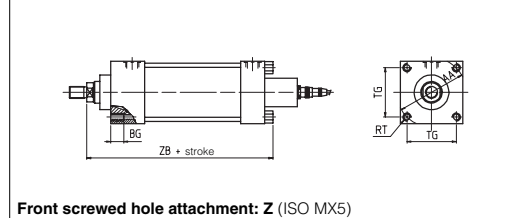
Mid-body trunnion attachment: L (ISO MT4)



Front flange attachment: N (ISO ME5)

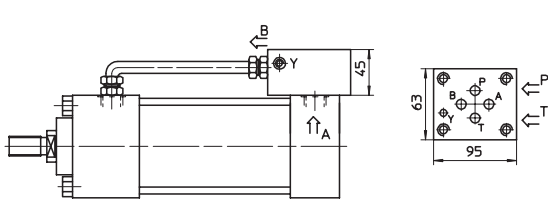


Attachment with extended tie-rods: Y (ISO MX3)

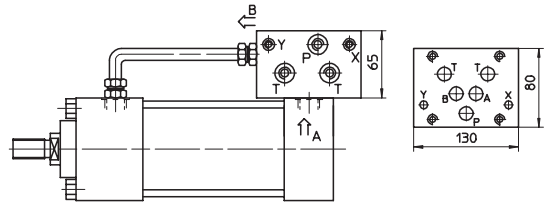


Front screwed hole attachment: Z (ISO MX5)

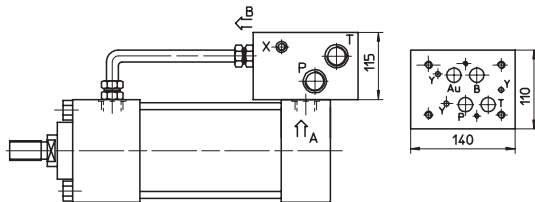
14 BUILT-IN SUBPLATES



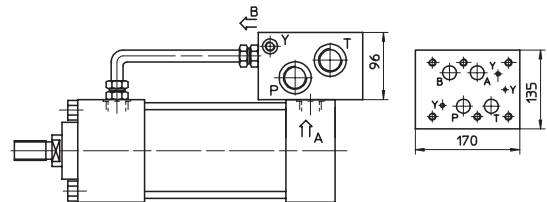
Cylinder with ISO 4401 size 06 subplate (option /10)
 For CK* 40-200 with minimum stroke 100 mm; for lower stroke values fit spacers must be provided (consult our technical office for information) with an increase of the axial dimension.
 Attachments P and T are G 3/8".



Cylinder with ISO 4401 size 10 subplate (option /20)
 For CK* 40-200 with minimum stroke 150 mm; for lower stroke values, fit spacers must be provided (consult our technical office for information) with an increase of the axial dimensions.
 Attachments P and T are G 3/4", attachments X and Y are G 1/4".



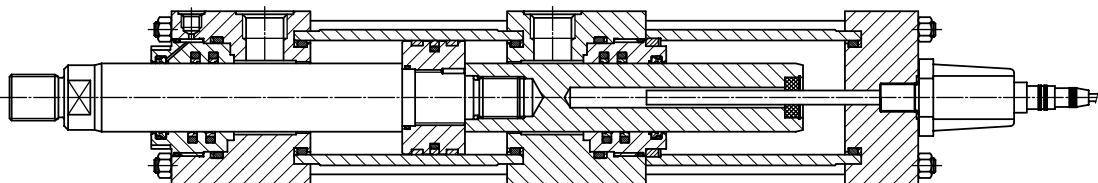
Cylinder with ISO 4401 size 16 subplate (option /30)
 For CK* 80-200 with minimum stroke 150 mm; for lower stroke values, fit spacers must be provided (consult our technical office for information) with an increase of the axial dimensions.
 Attachments P and T are G 1", attachments X and Y are G 1/4".



Cylinder with ISO 4401 size 25 subplate (option /40)
 For CK*125-200 with minimum stroke 150 mm; for lower stroke values, fit spacers must be provided (consult our technical office for information) with an increase of the axial dimensions.
 Attachments P and T are G 1", attachments X and Y are G 1/4".

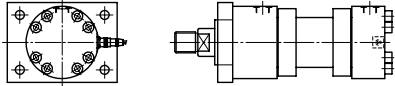
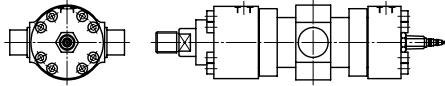
15 DOUBLE ROD EXECUTIONS

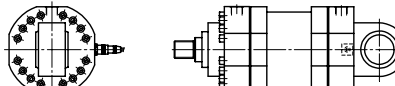
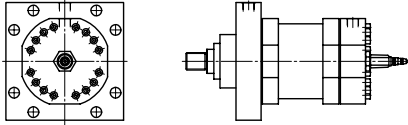
CK* servocylinders can be realized also in double rod execution, for applications where it is advisable that the sections of both sides are equal. In this case only one of the two rods can be used for the mounting; the second is fully inside housed and supports the moving part of the transducer (see the below typical section). Consult our technical office for feasibility and dimensions.

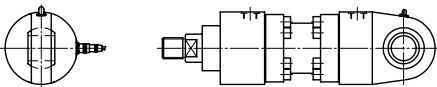
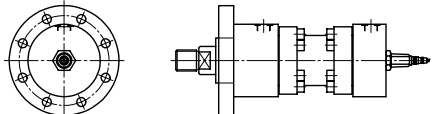


16 OTHER AVAILABLE VERSIONS

Servocylinders derived from the CC series (ISO 6022 P = 250 bar; tab. B241), CH big diameters (ISO 6020-3 P = 160 bar; tab. B160), CN (ISO 6020-1 P = 160 bar; tab. B180) are available on request. Consult our technical office for further details.

BASIC CYLINDER	DERIVED SERVOCYLINDERS	
<p>CN (tab. B180) ISO-DIN 6020-1 Pnom 160 bar Pmax 250 bar Ø piston 50÷200 mm Ø rod 36÷140 mm</p>	<p>CNP, CNV</p>  <p>example of "N" attachment</p>	<p>CNF, CNM</p>  <p>example of "L" attachment</p>

BASIC CYLINDER	DERIVED SERVOCYLINDERS	
<p>CH big ø (tab. B160) ISO 6020-3 Pnom 160 bar Pmax 250 bar Ø piston 250÷400 mm Ø rod 140÷220 mm</p>	<p>CHP, CHV</p>  <p>example of "S" attachment</p>	<p>CHF, CHM</p>  <p>example of "N" attachment</p>

BASIC CYLINDER	DERIVED SERVOCYLINDERS	
<p>CC (tab. B241) ISO 6022 - DIN 24333 Pnom 250 bar Pmax 320 bar Ø piston 50÷400 mm Ø rod 36÷280 mm</p>	<p>CCP, CCV</p>  <p>example of "S" attachment</p>	<p>CCF, CCM</p>  <p>example of "A" attachment</p>

After the check of our technical office, it is possible to supply also specific executions, simple and double rod, for specific application requirements:

- with seals and other systems for speeds up to 4 m/sec;
- with rod/piston in one only piece and proper guide systems for fatigue resistance and/or cyclic works up with frequencies higher than 20 Hz;
- with stainless steel rods and/or special surface treatments;
- weather proof or explosion-proof versions and/or specific versions to MIL standards.