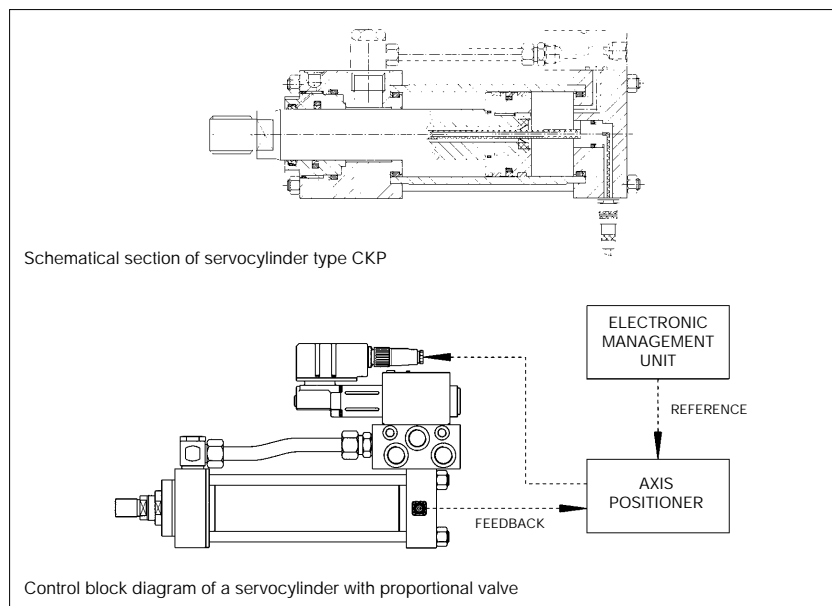




# Servocylinders type CK\* with built-in transducer

to ISO 6020-2 -1991, DIN 24554, AFNOR NFE 48-016

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



Electrohydraulic servocylinders CK\* are double acting actuators, low friction execution with built-in electronic transducer for 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 6020-2-91 and DIN 24554, see tab. B137.
- Bore sizes from Ø 40 to Ø 200 mm.
- Standard strokes and strokes on request.
- Potentiometric, magnetosonic or inductive transducers, see section 1, 2, 3, 4, 5.
- As a standard: rod side drain, double rod seal, air bleeds on the heads, air bleed on the rod axis to facilitate the removal of air from the transducer housing cavity.

See section 11 on on-board on/off valves or proportional valves (also with integral electronics) in order to allow the maximum hydraulic strength of the system and to allow fast response time, a better repeatability and regulation precision.

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

TRANSDUCER TYPE	RESOLUTION	INDEPENDENT LINEARITY (1)	REPEATABILITY (1)	MAXIMUM SPEED	TEMPERATURE RANGE	TEMPERATURE COEFFICIENT	STANDARD STROKES (2) [mm]	MAXIMUM STROKE [mm]
POTENTIOMETRIC	infinite	± 0,025%	≤ 0,01%	1 m/s	-20 + 70 °C	± 0,1% /°C	100, 200, 300, 400, 500, 700, 900	2000
INDUCTIVE (VRVT)	infinite	± 0,20%	± 0,02%	2 m/s	-30 + 80 °C	± 0,02% /°C	100, 200, 300, 400, 500, 700, 900	1000
INDUCTIVE (LVDT)	infinite	± 0,25%	± 0,02%	2 m/s	-20 + 80 °C	± 0,002% /°C	100 (± 50) 200 (± 100) 300 (± 150)	300 (± 150)
MAGNETOSONIC	infinite	± 0,05%	± 0,001%	2 m/s	-20 + 65 °C	± 0,02% /°C	100, 200, 300, 400, 500, 700, 900	2000

1) Percentage of total stroke; 2) see note 4 at section 10 (STROKES)

## 2 MODEL CODE

**CK P / 10 - 50 / 36 \*0500 - S 2 0 8 K Q 20**

Cylinder series

**CK** = To ISO 6020-2 1991 and DIN 24554

**CH** = Assembled series with counterflange (for Ø 63÷200 mm).

**Built-in transducer**

**P** = potentiometric

**M** = magnetosonic

**V** = VRVT inductive

**W** = LVDT inductive

Built-in subplates:

**00** = without subplate

**10** = CETOP 03 subplate (CK\* 40÷200)

**20** = CETOP 05R subplate (CK\* 40÷200)

Contact our technical office for /20

Characteristics and dimensions in section 11

Bore diameter [mm]. See section 6 for available dimensions

Rod diameter [mm]. See section 6 for available dimensions

Contact our technical office for double rod executions

Stroke [mm]. Select one of the following standard strokes:

CKP, CKM, CKV: 100, 200, 300, 400, 500, 700, 900

CKW: 100, 200, 300

Contact our technical office for other strokes.

See section 11 for maximum strokes.

Attachments, see section 8

RIF. ISO

RIF. ISO

**X** = basic execution

**C** = female clevis

**D** = male clevis

**E** = feet

**G** = front trunnion

**MP1**

**MP3**

**MS2**

**MT1**

**L** = mid-body trunnion

**N** = front flange

**P** = rear flange

**S** = swivel with eye

**M14**

**ME5**

**ME6**

**MP5**

For other attachments to ISO 6020-2, consult our technical office.  
 Installation dimensions in section 6, 7 and 8 considering the oversizes of section 9

Design number

It is important to indicate the design number in case spare parts are requested.

Suffix to be indicated only when using transducers with special strokes. See note 4 at section 10 (STROKES)

Options - to be reported in alphabetical order.

**H** = rod thread according to DIN 24554 - provided on rods of Ø 56÷140.

**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:

**A** = current output electric signal 4÷20 mA.

**V** = voltage output electric signal 0÷10 V.

For further information, see section 4.

Seals:

**8** = (NITRILE + PTFE and POLIURETHAN) anti-friction, for speed up to 1 m/sec; for mineral oil, water-glycol 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.

**0** = Special executions for high working frequencies, micro-strokes, special fluids. Consult our technical office to check applications.

For other characteristics, see table B005.

Seals type 0, 2 and 4 are not available for servocylinders type CKP.

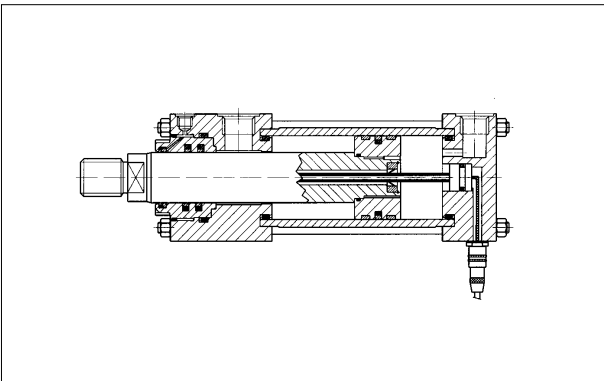
Spacers: **2** = 50 mm **4** = 100 mm **6** = 150 mm **8** = 200 mm  
 See tab. B005 (section 5.4) for recommended dimensions according to the stroke.

Cushioning - Available for CK\* Ø 63÷200 only on the front head side.

**0** = without cushioning **2** = front cushioning

For rear cushioning, consult our technical office.

**3 SERVOCYLINDERS TYPE CKP (POTENTIOMETRIC TRANSDUCER)**



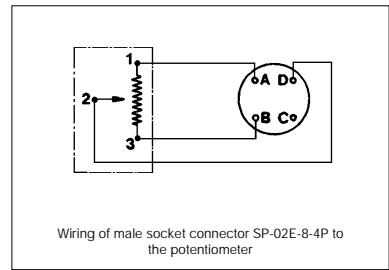
The CKP type with potentiometric transducer is the widespread model for its cheapness and reliability. The potentiometric transducer is composed by a resistive element of conductive plastics in oil and by a multiple wiper of noble metal directly coupled to the cylinder rod and integral with it during the movement.

Transducer characteristics:  
 Electrical resistance = 0,75 K $\Omega$  /100 mm; (tolerance  $\pm$  20%)  
 Isolation resistance = > 1000 M $\Omega$  at 500 Vdc  
 Maximum power = 0,3 W/cm at 25°C  
 Power supply = 0  $\div$  10 Vdc  
 Average life = > 30.10<sup>6</sup> cycles (stroke 100 mm)

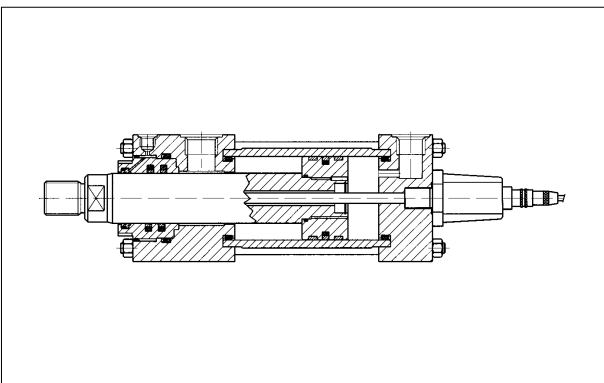
For available attachments and related dimensions see sections 6, 7, 8.

**NOTES**

- Fluids:** realized for hydraulic mineral oil utilization, CKP can be also used with organic esters based fluids. **They cannot be used with water glycol.** For compatibility with other fluids, consult our technical office.
- Electrical connectors:** 4-poles male socket connector mounted on the rear head, plus the relative female plug connector (included into delivery) with protection degree IP65. For electric wiring, see the side drawing.
- General notes:** for corrected functioning, the potentiometric transducer must be used exclusively as potential divider; different uses (i.e. resistance divider or other) reduce the performances and damage the integrity of the component. Maximum load > 10.000 x R<sub>tot</sub>.



**4 SERVOCYLINDERS TYPE CKM (MAGNETOSONIC TRANSDUCER)**



The magneto-sonic transducer is composed by a metallic wire integral with the cylinder body and by a permanent magnet integral with the cylinder rod. A twist pulse runs at constant speed along the wire and returns along a waveguide which is around the wire. The magnetostrictive effect brings about a short-term elastic deformation of the molecular structure of the waveguide through the interaction of two magnetic fields. The total running time of pulse is proportional to the position of the magnet and is therefore a measurement for the actual displacement of the rod.

Long working life, and high working frequencies cause there is no contact between the moving parts of the transducer.

These transducers can be used also where the environment subjects the transducer to shock and vibrations.

The integral conversion electronics of the transducer gives an output analogic signal that can be in tension 0  $\div$  10V (option V) or in current 4  $\div$  20 mA (option A). **The suffixe related to the selected output signal must always be indicated in the model code of the servocylinder, see section 2.**

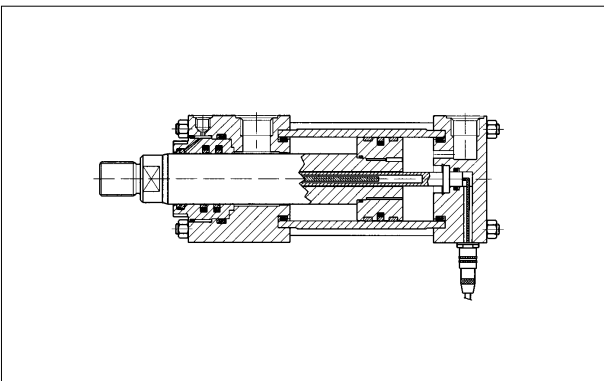
On request are available transducers with digital output of Serial-Synchronous type (SSI) and CAN-Bus please consult our technical office.

For available attachments and related dimensions see sections 6, 7, 8 considering the oversizes indicated at section 9,1.

**NOTES**

- Fluids:** realized for hydraulic mineral oil utilization, CKM can be also used with organic esters or phosphate esters based fluids, by previous proper selection of seals and control of our technical office.
- Electrical connectors:** 6-poles male socket connector, mounted on the rear projecting part of the transducer, plus the relative female plug connector (included into delivery) with protection degree IP65. For electric wiring, please consult the technical documentation enclosed with the product.
- General notes:** the transducer and its integral electronic can be replaced without disassembling the cylinder and this is a great advantage for maintenance.

**5 SERVOCYLINDERS TYPE CKV AND CKW (INDUCTIVE TRANSDUCER)**



Two different types of inductive transducer:

- type **LVDT** (for **CKW**): the foundation is a differential transformer where the voltage amplitude on the secondary circuit changes by changing the core position and therefore by changing the cylinder rod position;
- type **VRVT** (for **CKV**): the foundation is an inductor where the phase angle between voltage and excitation current changes by changing the core position and therefore by changing the cylinder rod position.

In both versions the moving parts are contactless for a long working life. They can be used also where the environment subjects the transducer to shock and vibrations.

For available attachments and related dimensions see sections 6, 7, 8, considering the oversizes indicated at section 9,2.

**NOTES**

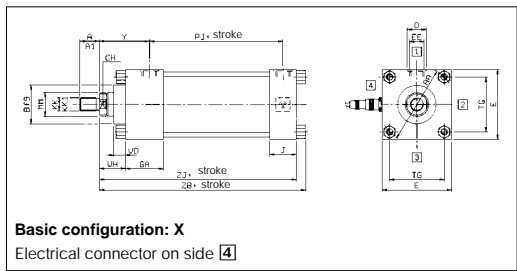
- Fluids:** realized for hydraulic mineral oil utilization, CKV and CKW can be also used with phosphate esters based fluids - by previous proper selection of seals and control of our technical office - and with water glycol (water percentage not higher than 40%). For compatibility with other fluids, consult our technical office.
- Electrical connectors:** 4-poles male socket connector mounted on the rear head, plus the relative female plug connector with (included into delivery) protection degree IP65. For electric wiring, please consult the technical documentation enclosed with the product.
- General notes:** on request can be supplied proper electronic interface cards in Eurocard format (E-ME-Y-0TL for CKW; E-ME-Y-0TV for CKV) which feed the inductive transducers and give as output an analogic signal in tension  $\pm$  10V or in current 4  $\div$  20 mA proportional to the actual rod position. For more details consult the technical table G360.

**6 INSTALLATION DIMENSIONS [mm]**

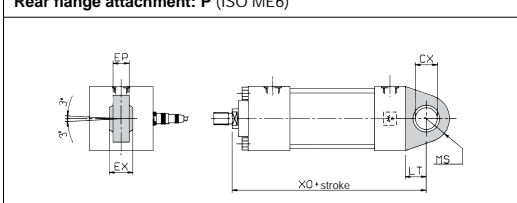
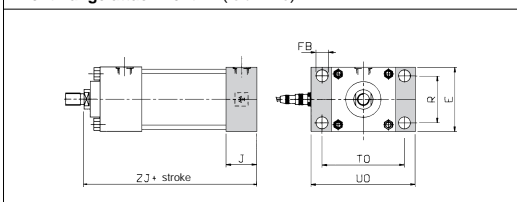
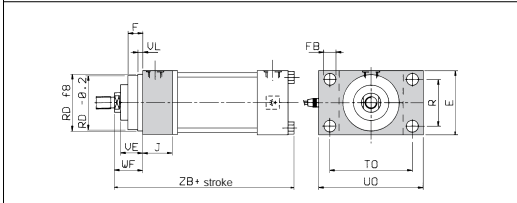
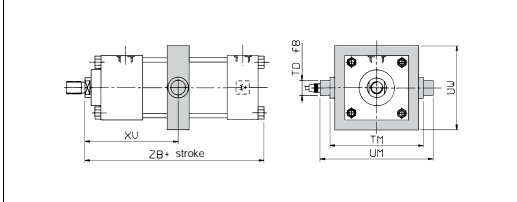
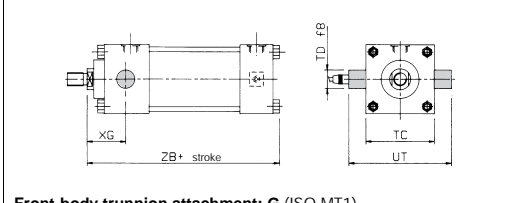
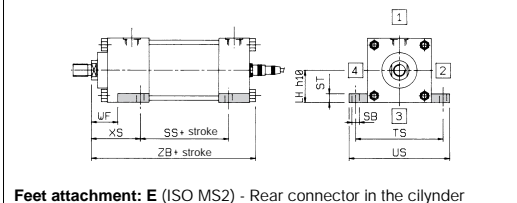
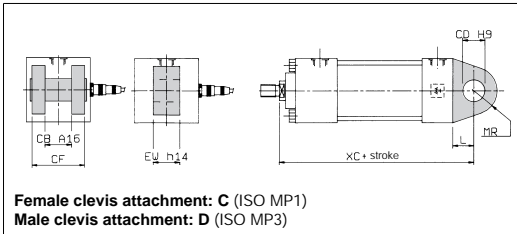
Ø PISTON	40	50	63	80	100	125	160	200	
Ø ROD	28	36	45	56	70	90	110	140	
A	28	36	45	56	63	85	95	112	
A1 (suff. H)	—	—	—	36	45	56	63	85	
AA	59	74	91	117	137	178	219	269	
B f9	42	50	60	72	88	108	133	163	
CB A16	20	30	30	40	50	60	70	80	
CD	14	20	20	28	36	45	56	70	
CF	40	60	60	80	100	120	140	160	
CH	22	30	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 (BSP)	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 (1)	35	41	48	51	57	57	57	57	
WH (1)	25	25	32	31	35	35	32	32	
XG (1)	57	64	70	76	71	75	75	85	
XS (1)	45	54	65	68	79	79	86	923	
minimum stroke for CH execution	-	-	150	150	200	200	300	300	
minimum stroke for execution with attachment L	19	27	41	48	51	71	94	96	
XV min	107	117	132	147	158	180	198	226	
XV max	100+stroke	90+stroke	91+stroke	99+stroke	107+stroke	109+stroke	104+stroke	130+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 (2)	184	191	200	229	257	289	308	381
	XO (2)	190	190	206	238	261	304	337	415
	ZB max (2)	178	176	185	212	225	260	279	336
ZJ (2)	165	159	168	190	203	232	245	299	

(1) Valid for CKP. For CKM, CKV, CKM please consult section 9  
 (2) Valid for CKP, CKV, CKW. For CKM please consult section 9  
 - 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  
 - For further information, please consult table B137.

**7 BASIC CONFIGURATION'S**

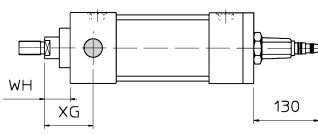
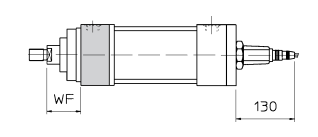
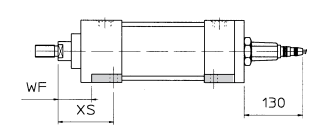
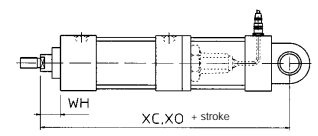


**8 ATTACHMENTS**

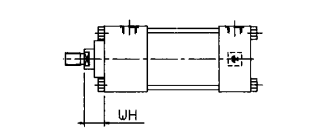
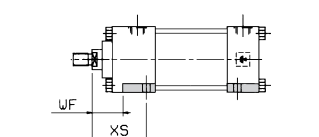
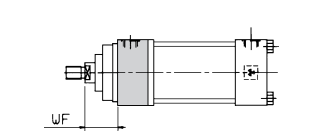
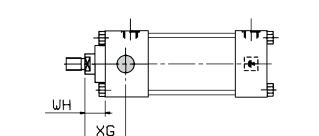


**9 CHARACTERISTIC DIMENSIONS FOR CKM, CKV, CKW**

**9.1 OVERSIZES FOR CKM**

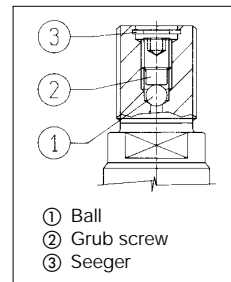
 Attachments K, G, L, P	Ø PISTON	WF	WH	XC	XG	XO	XS
	40	77	67	451	99	457	87
 Attachment N	50	79	63	466	102	469	92
	63	76	60	472	98	478	93
 Attachment E	80	61	41	494	86	503	78
	100	57	35	536	71	540	79
 Attachments C, S	125	57	35	575	75	590	79
	160	57	32	607	75	636	86
	200	57	32	694	85	728	92

**9.2 OVERSIZES FOR CKW, CKV**

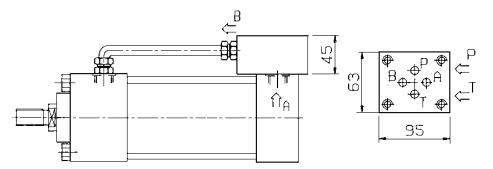
 Attachments X, L, P	Ø PISTON	WF	WH	XC	XG	XS
	40	77	67	226	99	87
 Attachment E	50	79	63	229	102	92
	63	76	60	228	98	93
 Attachment N	80	61	41	239	86	78
	100	57	35	257	71	79
 Attachment G	125	57	35	289	75	79
	160	57	32	308	75	85
200	57	32	381	85	92	

**10 START-UP AND CORRECT USE NOTES FOR SERVOCYLINDERS**

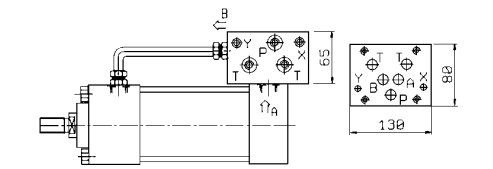
- Fluid recommended viscosity: 15 ÷ 100 m/s; Minimum viscosity index: 90; Temperature: 0 ÷ 70°C; Fluid contamination rate: ISO 19/16.
- During the installation, the rod cavity in which the transducer is placed must be filled with fluid, feeding the rear side of the cylinder with a level not higher than 10 l/min, and taking care that the air is completely evacuated. Owing to this, proper air bleeds on the axis rod are supplied (see drawing on side). During the pause times, avoid the fluid evacuation from this cavity.
- During the start-up it is necessary to purge the air from the servocylinder by loosening the air bleeds supplied as a standard on the heads and by acting again and again the cylinder at reduced speed. The drain port (1/8" BSP), supplied as a standard, must be connected to tank without counter-pressure.
- Strokes:** it would be better to select one of standard strokes indicated at section 11 according to the selected transducer. If no standard strokes without other specification are requested, servocylinders are assembled using transducers with a standard stroke which is longer than the one requested (anyway, standard stroke transducers are used); they are inserted inside the perforated rod inserting, if necessary, the suitable spacers. In this case only a part of the transducer stroke is used and so the "mechanical stroke" of the cylinder and the "total electric stroke" of the transducer do not coincide and it can be necessary to use some "electric devices" for a proper interpretation of the feedback. On request there are available servocylinders assembled with transducers with a non standard stroke which is coincident with the mechanical one: in this case suffix **Q** must be reported in the model code. For non standard strokes, consult anyway our technical office.



**11 BUILT-IN SUBPLATES**



Cylinder with ISO/CETOP 03 subplate (option/10)  
 For CK\* 40-200 with minimum stroke 100 mm; for lower values fit spacers must be provided (consult our technical office for information) with an increase of the axial dimension. Attachments P and T are 3/8" BSP.



Cylinder with ISO/CETOP 05R subplate (option/20)  
 For CK\* 40-200 with minimum stroke 150 mm; for lower values, fit spacers must be provided (consult our technical office for information) with an increase of the axial dimensions. Attachments P and T are 3/4" BSP, attachments X and Y are 1/4" BSP.

**12 OTHER POSSIBLE EXECUTIONS**

On request also servocylinders derived from CC series (ISO 6022 p = 250 bar) and CH big diameters (ISO 6020-3 p = 160 bar) are available, according to the summarizing table below. Consult our technical office for further information.

BASIC CYLINDER	DERIVED SERVOCYLINDER		
	Potentiometric transducer code <b>P</b>	Inductive transducer VRVT: code <b>V</b> LVDT: code <b>W</b>	Magnetosonic transducer code <b>M</b>
CC - tab. B241 <b>ISO 6022 - DIN 24333</b> Pnom 250 bar; Pmax 320 bar	<b>CCP</b> Ø piston 80÷400 mm Ø rods 56÷280 mm	<b>CCV - CCW</b> Ø piston 80÷400 mm Ø rods 56÷280 mm	<b>CCM</b> Ø piston 80÷400 mm Ø rods 56÷280 mm
CH big diameters - tab. B160 <b>ISO 6020-3</b> Pnom 160 bar; Pmax 250 bar	<b>CHP</b> Ø piston 250÷400 mm Ø rods 140÷220 mm	<b>CHV - CHW</b> Ø piston 250÷400 mm Ø rods 140÷220 mm	<b>CHM</b> Ø piston 250÷400 mm Ø rods 140÷220 mm

- After the check of our technical office, it is possible to supply also specific executions with a simple and double rod executions for specific application requirements:
- with seals and other systems for speeds up to 4 m/sec;
  - with rod/piston in an only piece, with proper guide systems for fatigue resistance and/or cyclic starting up with frequencies higher than 20 Hz;
  - with stainless steel rods also available with special surface treatments;
  - weather proof or explosion-proof versions and/or specific versions to MIL standards.