tyco
Flow Control

BIFFI

New design compact electric actuator for 90° operation.

Mechanical features

- High torque and speed performances with light weight and compact overall dimensions.
- Constant torque for complete operating stroke.
- Torque control in both rotation directions.
- Double spur gear reduction and planetary gear system which allows to obtain a high reduction ratio with inherent self-locking characteristics.
- All gearing with cut teeth, metal made, running in oil bath which allows high and constant efficiency and low power consumption.
- All rotating parts supported by roller bearings and a permanent oil lubrication.
- Manual operation by handwheel always engaged but not rotating during automatic operations.
- Standard flange according to ISO 5211.
- Mechanical adjustment of the position by mechanical stops connected directly to the actuator housing.
- O-ring sealing.
- Anodized aluminium enclosures.
- Final protection by epoxy-vinyl paint.

Electrical features

- On-Off service S2- 30 minutes or inching service S4-25% with max 200 starts/hour according to IEC 34-1.
- Electrical control and local indication of the valve position by a drive shaft directly connected to the valve stem bush.
- Electrical enclosure completely separated from the gearing housing.
- All electrical parts contained in only one enclosure to optimize all the wiring and setting operations and to minimize the joints in contact with the external ambient.
- Watertight as standard or explosionproof and watertight on request.
- Three cable entries suitable for cable or conduit connections.

Environment protection

- **Sealed construction**
  The actuator housing is built to IP 68, according to the IEC recommendations, publication 529, and certified by the Italian Lab CESI.

- **Sealed and explosion-proof construction**
  The electrical enclosures are manufactured by BIFFI and certified by the Italian Lab CESI, according to the European Norms (CENELEC) EN 50.014 and EN 50.018 for application in hazardous areas with degree EEx-d IIB T5.

General application

Suitable for actuation of ball, plug, butterfly valves or dampers.
Heavy duty applications such as oil and gas, petrochemical, power and water industries.

Technical data

Voltages	:	110/220V-1Ph-50Hz 115/240V-1Ph-60Hz 220/380V-3Ph-50Hz 240/415V-3Ph-50Hz 440/480V-3Ph-60Hz
Torques	:	up to 600 Nm
Time/90° stroke	:	from 6 up to 60 sec.
Temperature	:	-30°C to +85°C

1-phase supply at 50 Hz

	110V-50Hz-1Ph								230V-50Hz-1Ph							
Model	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**Cap**	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**Cap**
F01.150-032	0.032	2800	1.30	2.00	4.00	0.94	0.24	20	0.032	2800	0.65	1.00	2.00	0.94	0.24	5
F01.150-034	0.016	1380	0.70	1.40	2.40	0.96	0.22	12.5	0.016	1380	0.35	0.70	1.20	0.96	0.22	3.5
F01.150-036	0.012	920	0.60	1.20	2.00	0.98	0.19	12.5	0.012	920	0.30	0.60	1.00	0.98	0.19	3.5
F01.150-038	0.010	700	0.50	0.80	1.50	0.96	0.19	8	0.010	700	0.25	0.40	0.80	0.96	0.19	2
F01.150-052	0.040	2820	1.40	2.50	4.50	0.92	0.28	25	0.040	2820	0.70	1.25	2.30	0.92	0.28	6.3
F01.150-054	0.020	1400	0.80	1.50	2.50	0.94	0.24	16	0.020	1400	0.40	0.80	1.30	0.94	0.24	4
F01.300-052	0.040	2820	1.40	2.50	4.50	0.92	0.28	25	0.040	2820	0.70	1.25	2.30	0.92	0.28	6.3
F01.300-054	0.020	1400	0.80	1.50	2.50	0.94	0.24	16	0.020	1400	0.40	0.80	1.30	0.94	0.24	4
F01.300-056	0.014	930	0.60	1.20	2.00	0.97	0.22	12.5	0.014	930	0.30	0.60	1.00	0.97	0.22	3.5
F01.300-058	0.010	700	0.50	0.80	1.50	0.96	0.19	8	0.010	700	0.25	0.40	0.80	0.96	0.19	2
F01.300-102	0.080	2850	2.10	3.00	5.50	0.90	0.38	50	0.080	2850	1.00	1.50	3.00	0.90	0.40	12.5
F01.300-104	0.040	1420	1.40	2.50	4.50	0.92	0.28	25	0.040	1420	0.70	1.30	2.30	0.92	0.28	6.3
F01.600-102	0.080	2850	2.10	3.00	5.50	0.90	0.38	50	0.080	2850	1.00	1.50	3.00	0.90	0.40	12.5
F01.600-104	0.040	1420	1.40	2.50	4.50	0.92	0.28	25	0.040	1420	0.70	1.30	2.30	0.92	0.28	6.3
F01.600-106	0.030	940	1.20	2.00	3.50	0.94	0.24	20	0.030	940	0.60	1.00	1.80	0.94	0.24	5
F01.600-108	0.020	720	0.80	1.50	2.50	0.94	0.24	16	0.020	720	0.40	0.80	1.30	0.94	0.24	4

1-phase supply at 60 Hz

	115V-60Hz-1Ph								240V-60Hz-1Ph							
Model	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**Cap**	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**Cap**
F01.150-032	0.038	3360	1.30	2.00	4.00	0.94	0.37	16	0.038	3360	0.65	1.00	2.00	0.94	0.26	5
F01.150-034	0.020	1660	0.70	1.40	2.40	0.96	0.26	10	0.020	1660	0.35	0.70	1.20	0.96	0.25	3.5
F01.150-036	0.014	1100	0.60	1.20	2.00	0.98	0.21	10	0.014	1100	0.30	0.60	1.00	0.98	0.20	3.5
F01.150-038	0.012	840	0.50	0.80	1.50	0.96	0.22	6.3	0.012	840	0.25	0.40	0.80	0.96	0.20	2
F01.150-052	0.048	3380	1.40	2.50	4.50	0.92	0.32	20	0.048	3380	0.70	1.25	2.30	0.92	0.31	6.3
F01.150-054	0.024	1680	0.80	1.50	2.50	0.94	0.28	12.5	0.024	1680	0.40	0.80	1.30	0.94	0.27	4
F01.300-052	0.048	3380	1.40	2.50	4.50	0.92	0.32	20	0.048	3380	0.70	1.25	2.30	0.92	0.31	6.3
F01.300-054	0.024	1680	0.80	1.50	2.50	0.94	0.28	12.5	0.024	1680	0.40	0.80	1.30	0.94	0.27	4
F01.300-056	0.017	1120	0.60	1.20	2.00	0.97	0.25	10	0.017	1120	0.30	0.60	1.00	0.97	0.24	3.5
F01.300-058	0.012	840	0.50	0.80	1.50	0.96	0.22	6.3	0.012	840	0.25	0.40	0.80	0.96	0.20	2
F01.300-102	0.096	3420	2.10	3.00	5.50	0.90	0.44	40	0.096	3420	1.00	1.50	3.00	0.90	0.44	12.5
F01.300-104	0.048	1700	1.40	2.50	4.50	0.92	0.32	20	0.048	1700	0.70	1.30	2.30	0.92	0.31	6.3
F01.600-102	0.096	3420	2.10	3.00	5.50	0.90	0.44	40	0.096	3420	1.00	1.50	3.00	0.90	0.44	12.5
F01.600-104	0.048	1700	1.40	2.50	4.50	0.92	0.32	20	0.048	1700	0.70	1.30	2.30	0.92	0.31	6.3
F01.600-106	0.036	1130	1.20	2.00	3.50	0.94	0.28	16	0.036	1130	0.60	1.00	1.80	0.94	0.27	5
F01.600-108	0.024	860	0.80	1.50	2.50	0.94	0.28	12.5	0.024	860	0.40	0.80	1.30	0.94	0.27	4

Definitions

- KW = motor nominal power
- RPM = motor nominal speed in round per minute
- In = nominal current of the motor, according to IEC 34-1, which approximately corresponds to 40% of the actuator nominal torque
- Is = current which approximately corresponds to the actuator nominal torque (torque set 100%); we recommend to select cables and protections based on the above values
- Icc = locked rotor current
- PF = power factor
- Eff = motor efficiency
- Cap = capacitors value measured in microFarad

Motor insulation class H
Motors duty according to IEC 34-1
For ambient temperature up to +65°C:

- S2-30 minutes or S4-25%, max 200 starts/hour

For ambient temperature up to +85°C:

- S2-15 minutes or S4-25%, max 60 starts/hour

Tolerances

Nominal Voltage Tolerance : ± 6%
Nominal Frequency Tolerance : ± 2%
Momentary max permissible voltage variation : +10%; -15%
Other tolerances according to IEC 34-1

Nominal torque (Nm) and time (sec) for 90 degrees of rotation at 50Hz/60Hz							Handwheel	
Model	**6/5**	**12/10**	**15/12**	**30/25**	**45/37**	**60/50**	**torque factor**	**turns/90°**
F01.150-032			**150**					
F01.150-034				**150**				
F01.150-036					150			
F01.150-038						150		
F01.150-052	150							
F01.150-054		150						
F01.300-052			**300**				$48x10^{-3}$	21
F01.300-054				**300**				
F01.300-056					300			
F01.300-058						300		
F01.300-102	300							
F01.300-104		300						
F01.600-102			600					
F01.600-104				**600**				
F01.600-106					600			
F01.600-108						**600**		
Ratio	1063:1	1063:1	2759:1	2759:1	2759:1	2759:1		

Definitions

- Actuator duty according to IEC 34-1:
  On-Off: S2-30 minutes
  Inching: S4-25%, max 200 starts/hour
- Nominal torque = the output torque given by the actuator when the torque device is set and trips at max settable value of its scale
- Stall torque = from 1.4 to 2 times the nominal torque
- Time for 90° rotation = the actuator nominal operating time when the running torque is yielded
- Running torque = 0.4 times the nominal torque
- Handwheel torque factor = multiply the required output torque by this factor to obtain the handwheel torque
- Bold-faced values represent the performances of Standard models with 3-ph motors
- Identification code:
  Model / Nominal torque - time at 50 or 60Hz
  e.g.: F01.150-032 / 150 -12

Notes

The above characteristics are referred to the actuators with 3-phase or 1-phase asyncronous motors.

3-phase supply

	380V-50Hz-3Ph							415V-50Hz-3Ph							480V-60Hz-3Ph						
Model	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**	**KW**	**RPM**	**In(A)**	**Is(A)**	**Icc(A)**	**PF**	**Eff**
F01.150-032	0.032	2800	0.20	0.40	1.00	0.47	0.50	0.032	2800	0.20	0.40	1.00	0.47	0.47	0.038	3360	0.20	0.40	1.00	0.47	0.49
F01.150-034	0.016	1380	0.15	0.20	0.40	0.40	0.40	0.016	1380	0.14	0.20	0.40	0.40	0.40	0.020	1660	0.15	0.20	0.40	0.40	0.40
F01.150-036	0.012	920	0.14	0.20	0.40	0.38	0.34	0.012	920	0.12	0.20	0.40	0.38	0.37	0.014	1100	0.14	0.20	0.40	0.38	0.32
F01.150-038	0.010	700	0.12	0.20	0.50	0.36	0.35	0.010	700	0.11	0.20	0.50	0.36	0.35	0.012	840	0.12	0.20	0.50	0.36	0.34
F01.150-052	0.040	2820	0.25	0.40	1.00	0.47	0.52	0.040	2820	0.22	0.40	1.00	0.47	0.54	0.048	3380	0.25	0.40	1.00	0.47	0.49
F01.150-054	0.020	1400	0.16	0.20	0.40	0.42	0.46	0.020	1400	0.15	0.20	0.40	0.42	0.44	0.024	1680	0.16	0.20	0.40	0.42	0.43
F01.300-052	0.040	2820	0.25	0.40	1.00	0.47	0.52	0.040	2820	0.22	0.40	1.00	0.47	0.54	0.048	3380	0.25	0.40	1.00	0.47	0.49
F01.300-054	0.020	1400	0.16	0.20	0.40	0.42	0.46	0.020	1400	0.15	0.20	0.40	0.42	0.44	0.024	1680	0.16	0.20	0.40	0.42	0.43
F01.300-056	0.014	930	0.14	0.20	0.40	0.38	0.40	0.014	930	0.12	0.20	0.40	0.38	0.43	0.017	1120	0.14	0.20	0.40	0.38	0.38
F01.300-058	0.010	700	0.12	0.20	0.50	0.36	0.35	0.010	700	0.10	0.20	0.50	0.36	0.39	0.012	840	0.12	0.20	0.50	0.36	0.34
F01.300-102	0.080	2850	0.40	0.50	1.50	0.56	0.54	0.080	2850	0.35	0.50	1.50	0.56	0.57	0.096	3420	0.40	0.50	1.50	0.56	0.52
F01.300-104	0.040	1420	0.30	0.40	1.00	0.42	0.48	0.040	1420	0.30	0.40	1.00	0.42	0.44	0.048	1700	0.30	0.40	1.00	0.42	0.46
F01.600-102	0.080	2850	0.40	0.50	1.50	0.56	0.54	0.080	2850	0.35	0.50	1.50	0.56	0.57	0.096	3420	0.40	0.50	1.50	0.56	0.52
F01.600-104	0.040	1420	0.30	0.40	1.00	0.42	0.48	0.040	1420	0.30	0.40	1.00	0.42	0.44	0.048	1700	0.30	0.40	1.00	0.42	0.46
F01.600-106	0.030	940	0.25	0.40	0.80	0.40	0.46	0.030	940	0.22	0.40	0.80	0.40	0.47	0.036	1130	0.25	0.40	0.80	0.40	0.44
F01.600-108	0.020	720	0.20	0.30	0.60	0.38	0.40	0.020	720	0.20	0.30	0.60	0.38	0.37	0.024	860	0.20	0.30	0.60	0.38	0.38

Definitions

- KW = motor nominal power
- RPM = motor nominal speed in round per minute
- In = nominal current of the motor, according to IEC 34-1, which approximately corresponds to 40% of the actuator nominal torque
- Is = current which approximately corresponds to the actuator nominal torque (torque set 100%); we recommend to select cables and protections based on the above values
- Icc = locked rotor current
- PF = power factor
- Eff = motor efficiency
- Cap = capacitors value measured in microFarad

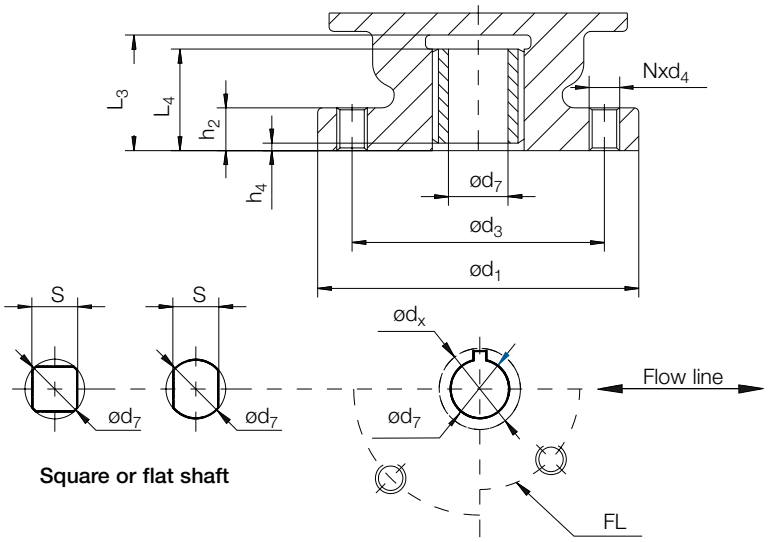
Motor insulation class H
Motors duty according to IEC 34-1
For ambient temperature up to +65°C:
- S2-30 minutes or S4-25%, max 200 starts/hour

For ambient temperature up to +85°C:
- S2-15 minutes or S4-25%, max 60 starts/hour

Tolerances
Nominal Voltage Tolerance : ± 6%
Nominal Frequency Tolerance : ± 2%
Momentary max permissible voltage variation : +10%; -15%
Other tolerances according to IEC 34-1

Notes

The current values shown on the table are referred to motors with Star connection; when the phases are Delta-connected multiply the current figures by factor 1.73.



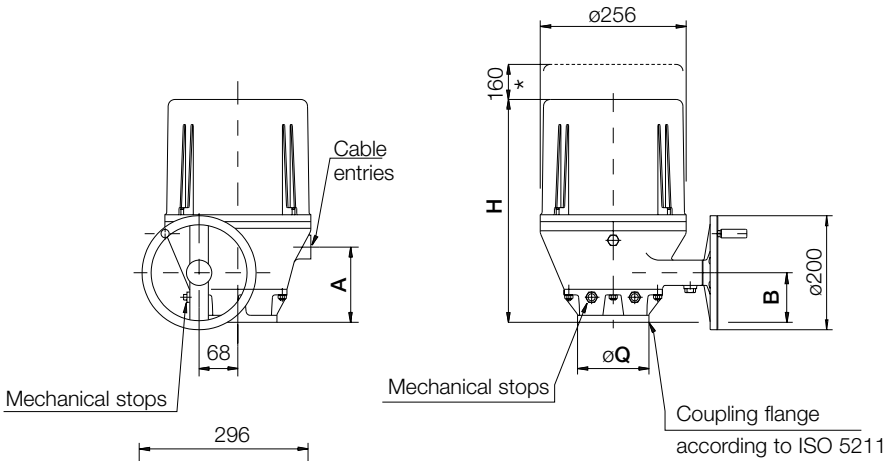
Square or flat shaft

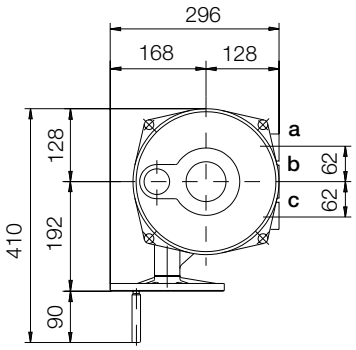
Notes

- $ød_7$ = insert bush supplied by BIFFI with unmachined bore; a solid piece bush will be supplied with larger bores
- d_4 = fixing bolts or rods supplied by BIFFI only on request, minimum material required ISO class 8.8
- $ød_x$ = maximum accepted diameter described by the key
- $ød_7$ = position of the shaft with the valve in closed position
- FL = the flange is provided, as standard, with an additional ISO P.C.D. boring as shown on FL line (e.g., for F01.150 and 300: $ød_3$ = 70; N = 4; d_4 = M8; for F01.600: $ød_3$ = 102; N = 4; d_4 = M10)

Dimensions

	F01.150	F01.300	F01.600
ISO 5211	F10	F10	F12
$ød_1$	125	125	150
$ød_3$	102	102	125
d_4	M10	M10	M12
$ød_7$ max	28	28	36
$ød_x$ max	36	36	45
h_2	16	16	18
h_4	1	1	1
L_3	50	50	60
L_4	48	48	58
N	4	4	4
S max	22	22	30
FL	F07	F07	F10





Cables entries

	a	b	c
ISO 7/1[Y]	Rc 1	Rc 1 1/2	Rc 1
NPT [V]	1	1 1/2	1
BS3643 [V]	M32x1.5	M40x1.5	M32x1.5
DIN 40430 [V]	Pg21	Pg29	Pg21

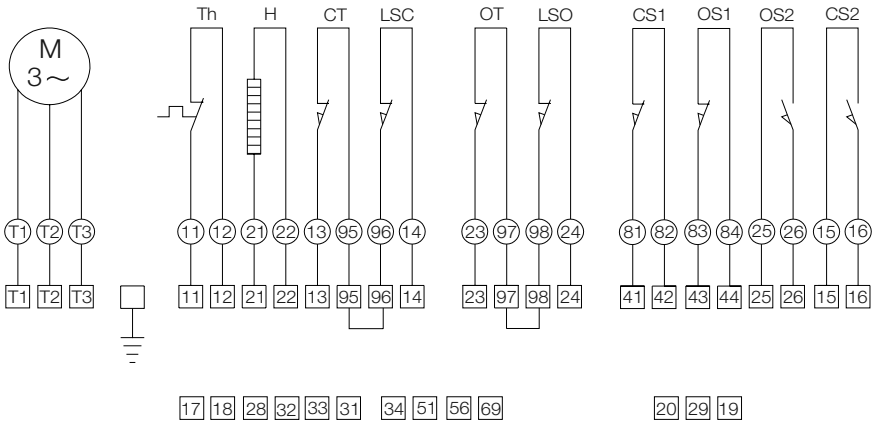
Notes

* = space for cover removal
Y = standard version
V = optional version, available on demand
Not certified drawing: certified dimensions will be supplied on request.
All dimensions are in mm.

Overall dimensions

Model	A	B	øQ	H	Weight (kg)
F01.150	132	87	125	391	21
F01.300	132	87	125	391	21
F01.600	142	97	150	401	23

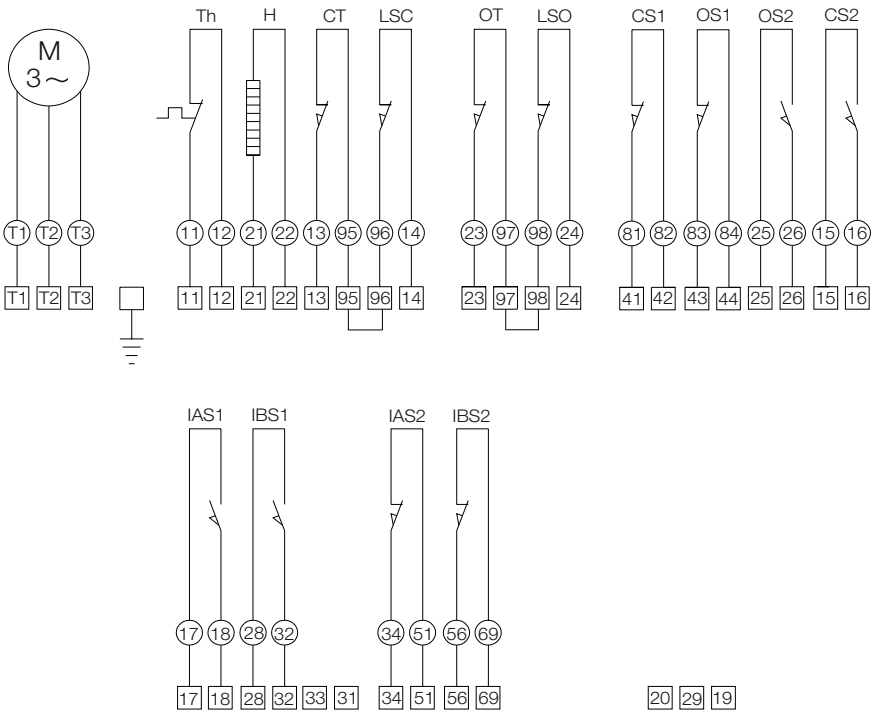
Ref. SE70B-00



Legenda

M	-	Three phase motor
M1	-	Single phase motor
Th	-	Motor thermostat
CT	-	Torque switch in closing direction
OT	-	Torque switch in opening direction
LSC	-	Closing end-travel switch
LSO	-	Opening end-travel switch
CS1,2	-	Signaling end-travel switch in closing
OS1,2	-	Signaling end-travel switch in opening
H	-	Heater
IAS1,2	-	Auxiliary limit switches
IBS1,2	-	Auxiliary limit switches
C	-	Capacitor

Ref. SE70D-00



Limit-switches function

Switch		Valve Position: Open	Intermediate	Close
CT	13-95	■	■	
OT	23-97		■	■
LSC	14-96	■	■	
LSO	24-98		■	■
CS1	81-82	■	■	
OS1	83-84		■	■
CS2	15-16			■
OS2	25-26	■		

Notes

1. The diagram is shown with valve in intermediate position.
2. Limit switches IAS1 and IAS2 can trip together at any point of the travel.
3. Limit switches IBS1 and IBS2 can trip together at any point of the travel.

○ = Internal wires identification number.
□ = Terminals for external connections.

Special versions

(consult factory)

- Modulating service for application where more than 200 starts/hour are requested
- Low temperature application for ambient temperature from -60°C to +65°C
- High temperature application for ambient temperature up to +85°C
- Single-phase or three-phase motors with special supply voltage
- DC motors from 24 VDC to 240 VDC
- Longer operating times obtained with special multi-poles motors

Accessories

(see separate leaflet)

- Position transmitter
- Auxiliary switches
- Special switches

Single phase motor connection