

Electro-Motor-Pumps ET



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1 General information

Electro-motor-pump is the simplest and more compact unit able to supply hydraulic power, as flow and pressure, to oil-dynamic actuators.

The Electro-motor-pumps are largely used on industrial operating machines particularly on mobile machines, where, through simple valves and hoses connections it makes possible to operate and control different hydraulics actuators.

In the present technical catalogue the most common versions, obtained as combination of DC motors and External Gear Pumps, either 05 (AP05) and 1 (AP100) group, are shown, although, many and different customised versions have been designed and realised in order to satisfy to specific and dedicated customer' requests.

2 D.C. Electric motors

2.1 Technical information

Versions:

Available voltage: 12-24 V D.C.

Available power rating: 0.8 - 3 kW.

For other input voltage and power rating, consult our Sales Department.

Direction of rotation:

Unless otherwise stated, all motors are specified clockwise rotation, suitable for driving counterclockwise pumps.

Directives and standards

- Atex:

The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC.

- ISO 9001: 2000

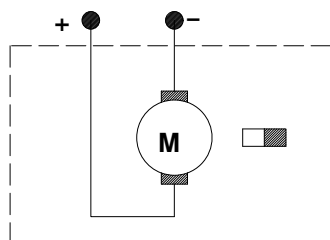
Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear pumps and motors, electro pumps, cartridge valves and integrated operating blocks for hydraulic applications.

Type of winding:

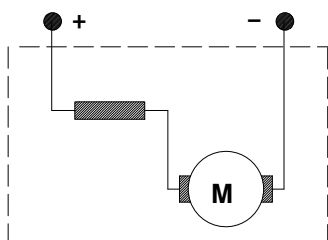
D.C. motors can be manufactured with different types of field windings:

- Permanent magnets
- Series
- Compound

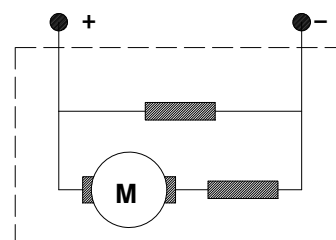
Permanent magnets



Series



Compound



Insulation class:

The class of electric insulation reflects the maximum temperature motor can register during operation without damage to the insulating material internally of motor itself.

The following table indicates insulation classes to CEI 15-26.

Class	Y	A	E	B	F	H
Temperature (°C)	90	105	120	130	155	180

Type of duty:

To ensure selection of the electric motor best suited to a given set of operating conditions, the duty cycle needs to be verified. Duty cycles S1, S2 and S3 are defined below in accordance with CEI 2-3

Continuous duty S1:

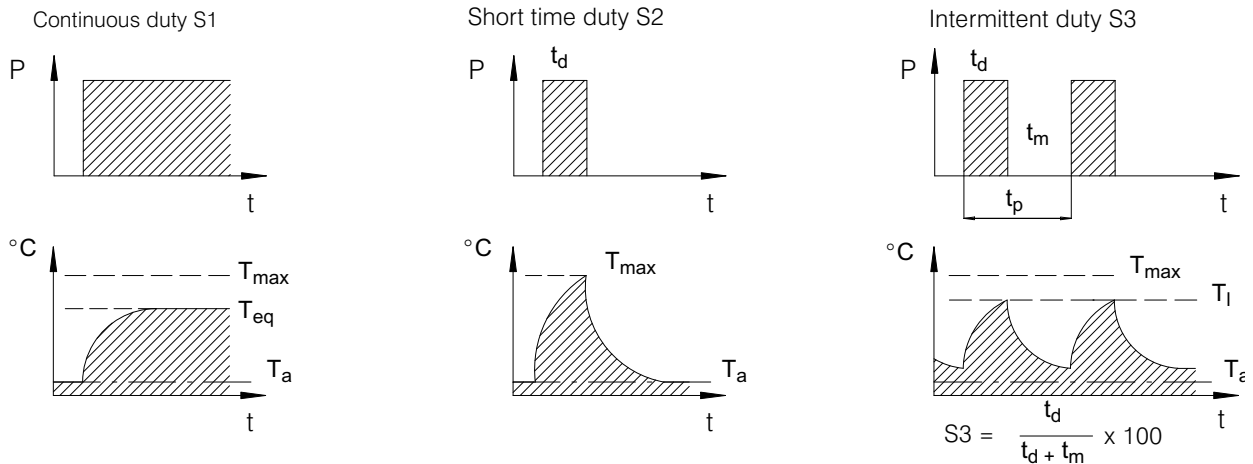
Operation on-load (Steady conditions) for a period of indefinite duration, during which the motor reaches thermal equilibrium without exceeding the maximum permissible temperature.

Short time duty S2

Operation on-load (steady conditions) for a period of limited duration, denoted t_d , during which maximum permissible temperature is reached, followed by an off-load period of duration sufficient for the temperature of the motor to return to ambient temperature.

Intermittent duty S3

A sequence of identical cycles, each 10 minutes in duration, the single cycle comprises a period of operation on-load (t_d), during which the motor may reach its maximum permissible temperature followed by an off-load period of limited duration (t_m), insufficient for the temperature of the motor to return to ambient temperature. The value of S3 indicates the duration of the on-load period (t_d) in relation to the overall cycle time (t_p), as a percentage.



P = load
T_{eq} = temperature at thermal equilibrium
T_{max} = maximum permissible temperature
T_I = operating temperature

T_a = ambient temperature
t_d = duration of on-load period
t_m = duration of off-load period
t_p = duration of cycle (10 min.)

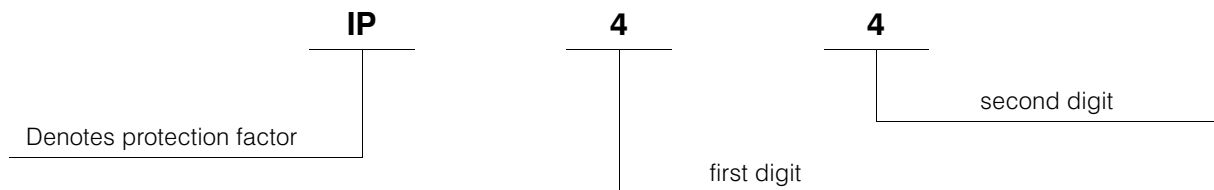
Protection degree:

This indicates the level of protection afforded in preventing contact between live parts of the motor and people or foreign matter generally, and preventing the penetration of

water.

The degree of protection is indicated in accordance with CEI 2-16 by the initials IP and two identifying digits:

Example:



The first digit indicates the degree of protection afforded to the motor against contact with people or foreign bodies.

0	no protection
1	protection against solid particles measuring > 50 mm
2	protection against solid particles measuring > 12 mm
3	protection against solid particles measuring > 2.5 mm
4	protection against solid particles measuring > 1 mm
5	protection against dust

The second digit indicates the degree of protection afforded to the motor against the effects of penetration by water.

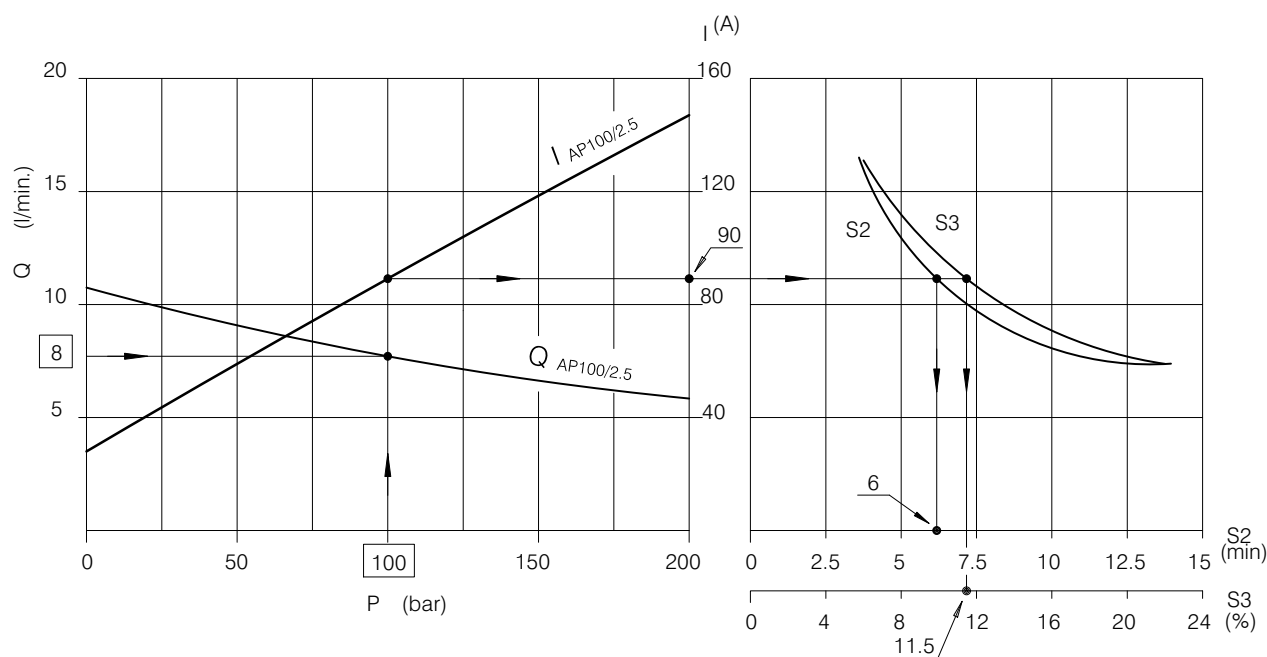
0	no protection
1	protection against water dripping vertically
2	protection against water dripping at 15° max
3	protection against rain
4	protected against water splash
5	protected against water spray

The degree of protection indicated for each individual electric motor refers to the motor when mounted to a Bucher Hydraulics S.p.A. electro-motor-pump.

2.2 Characteristic curves

Characteristic curves are given for each motors, from which to establish pressure, flow rate and current

consumption values, and S2 and S3 duty cycles.



2.3 Example of how the graphs are used

Required data

Flow rate $Q = 8$ l/min

Pressure $p = 100$ bar

Pump displacement

Determined by the intersection of the required p and Q curves.

In the example indicated, pump AP100/2.5 has the required p and Q specifications.

In the event that there is no point of intersection with any curve, a displacement as near as possible to the required flow rate should be selected.

Current consumption

This is determined by taking a vertical line from the pressure value to its point of intersection with the I curve corresponding to the selected displacement.

In the example illustrated, current consumption is:
 $I = 90$ Ampere

Type of use

Having established the current, the relationship of the S_2 and S_3 curves will give the following values:

$S_2 = 6$ min. $S_3 = 11.5$ %

2.4 Mounting directions

The tie bolts must not be withdrawn completely when fitting motors, but retracted a short distance (30-50 mm max).

Once fitted to the electro-motor-pump, the motor should be run off-load momentarily (5 seconds max) to verify its correct operation: supply power to the windings and measure the current drain, which must not exceed the following values:

24 V motor - $I < 35$ Ampere

12 V motor - $I < 70$ Ampere

Power cable

The wire selected for power connections must be of cross section appropriate for the rated current of the motor.

Tightening torques

When assembling the motor and power pack and securing the wires of the power cable to the motor terminals, observe the tightening torque values indicated.

Brush life

The brushes will wear down progressively with continued operation of the motor, and must be replaced when reduced to their minimum useful length.

Since the rate of wear on the brushes is dictated by the operating conditions and cannot therefore be broadly specified, consult our Sales Department for guidance.

3 Gear pumps

3.1 Suitable fluids

Only mineral oil based hydraulic fluids responding to ISO/ DIN standard should be used.

Viscosity range:

recommended 20 - 120 mm²/s (cSt)

permissible up to 700 mm²/s (cSt)

Operating temperature range: -15 +80 °C

For other fluids consult our Sales Department.



Attention: Use of pumps at temperatures above 80°C must always be agreed upon with our Technical Office, and in any case this can cause a significant worsening in the volumetric efficiency.

For use under conditions different from those indicated in this catalogue, please contact our Sales Department.

3.2 Inlet

Absolute pressure at the pump inlet must be

$V > 0.75$ bar (11 PSI)

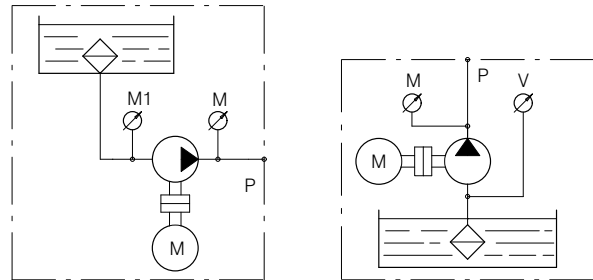
Accordingly, avoid:

- significant differences in height of pump and tank
- long pipeline runs
- sharp bends, restrictions, etc. causing turbulent flow

In certain applications, inlet pressure may be higher than 1 bar (14.3 PSI), or at any rate higher than atmospheric.

For pumps with standard configuration, the pressure registering at the gauge M1 should be:

$M1 < 3.5$ bar (50 PSI).



3.3 Outlet

Pressure levels:

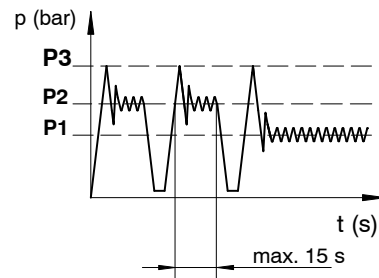
P1 = continuous operating pressure

P2 = intermittent operating pressure

P3 = peak pressure

The recommended delivery pipe oil speed is between: $v = 2 - 5$ m/s

In the next pages are indicated the performances for each pump.



4 Starter relays

Technical information

Versions:

Available voltages: 12-24 V D.C.

Heavy duty: for more arduous conditions

See relative table for technical data

Contact life:

The contacts of the relay will wear down progressively during operation.

Since the rate of wear is dedicated by the type of duty and cannot therefore be broadly specified, consult our Sales dept. for guideline information.

Fitment to electric motor

Starter relays can be fitted to the frame of the motor by two different methods:

1. Direct

The relay is secured with screws, using holes already tapped in motor frame. In this instance there is one standard mounting position only.

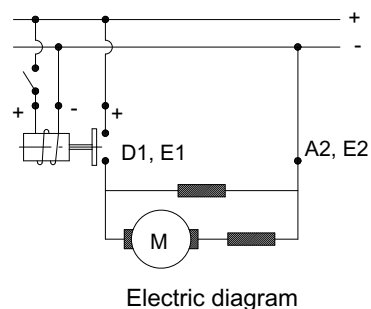
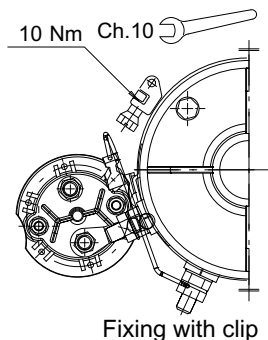
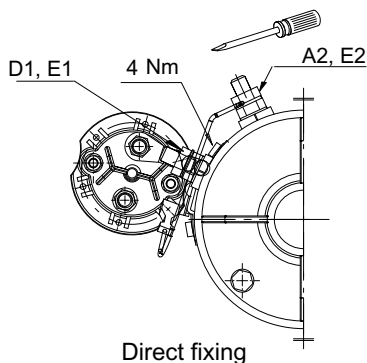
2. Metal clip

The relay is secured by means of a clip encircling the motor frame and inserted through special slots in the feet of the relay itself.

In this instance, several mounting positions are possible.

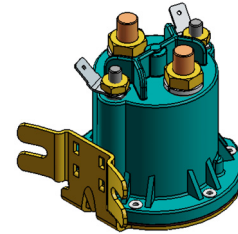
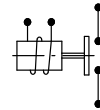
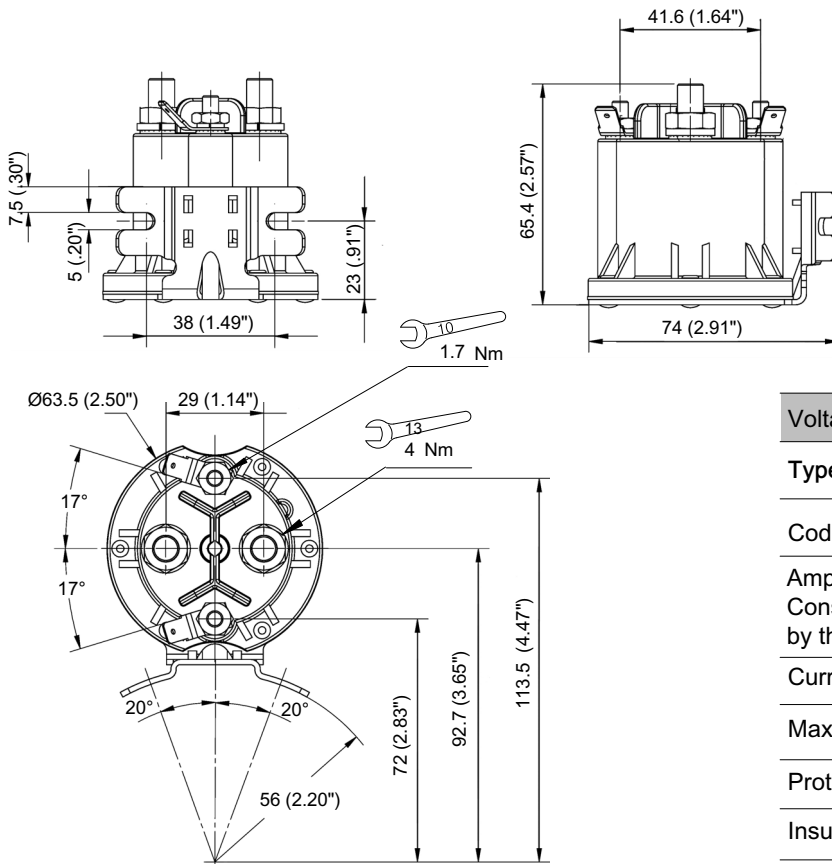
Electrical diagram

A typical arrangement for connection of the relay to the electric motor is shown in the diagram.



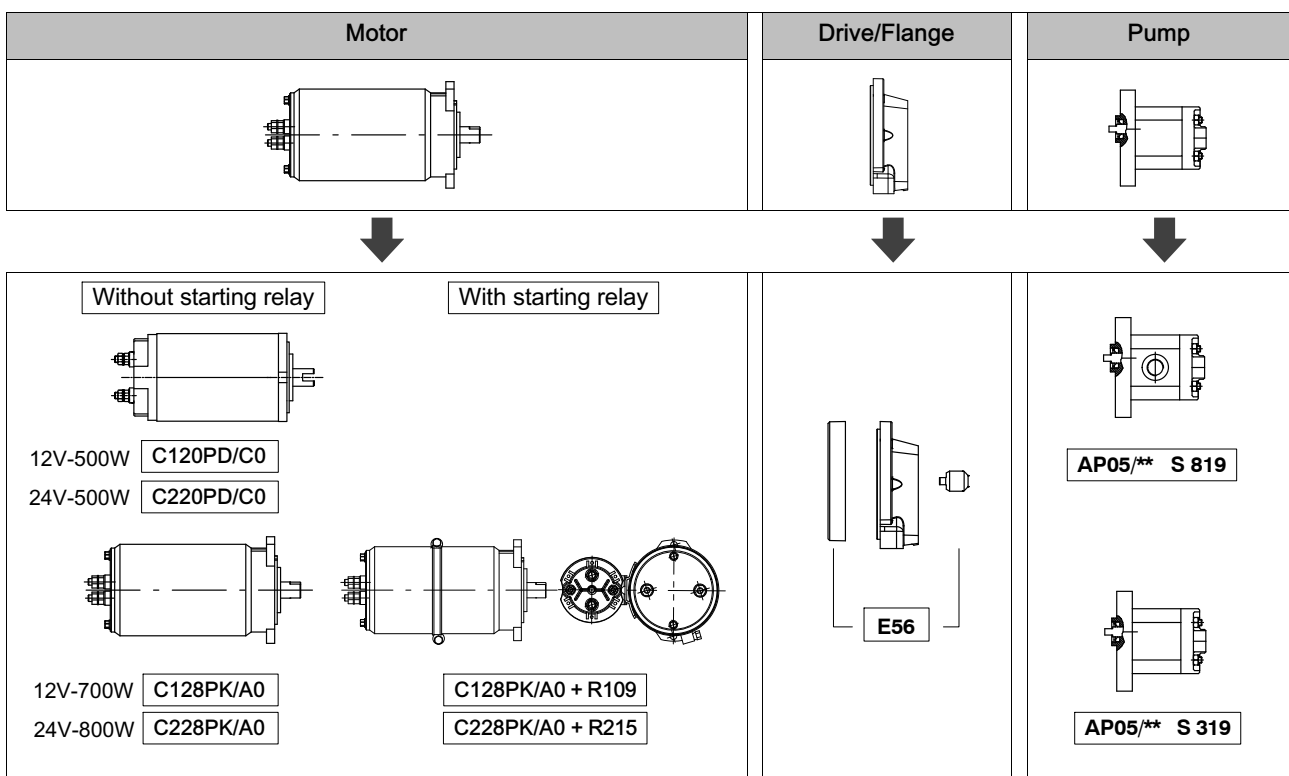
Heavy duty (STANDARD for wide range of DC el. motors)

Weight: 0.366 kg



Voltage	12 V	24 V
Type	R109	R215
Code	200544134109	200544134215
Amps Consumption by the coil	2.2 A	1.2 A
Current for continuous duty		150 A
Max. current (5 sec.)		800 A
Protection index		IP66
Insulation class		F

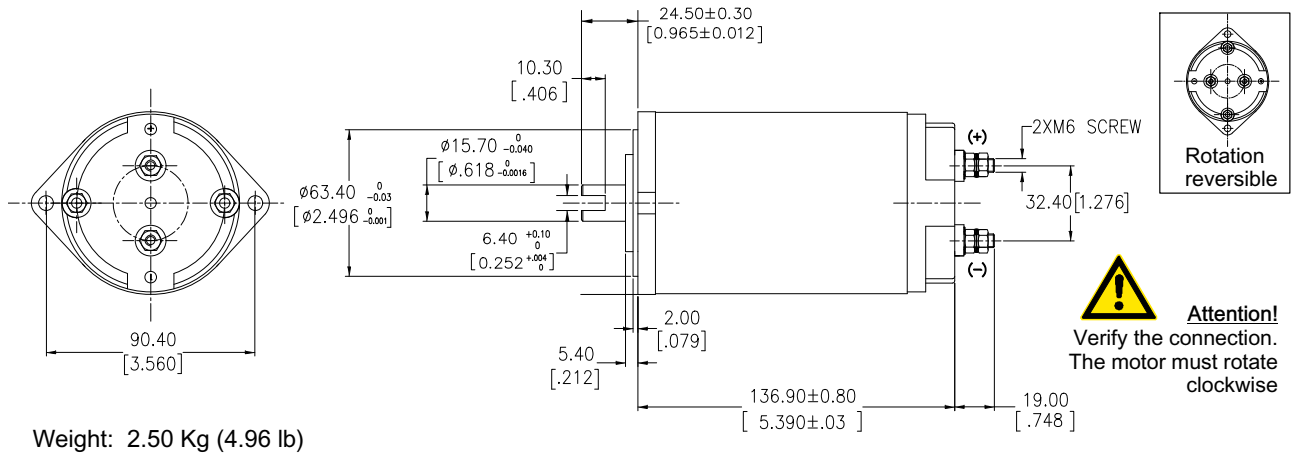
5 Electro-Motor-Pumps for group 05 pumps



6 D.C. Electric motors for group 05 pumps

Voltage	12 V	24 V
Nominal Power	500 W	500 W

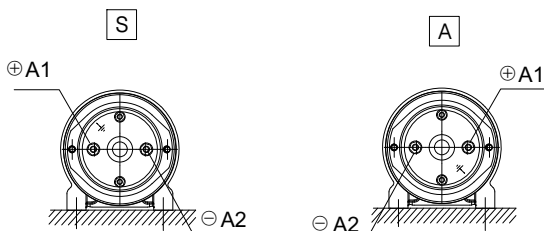
Protection index: IP54
 Insulation class: F
 Type of winding: Permanent magnets



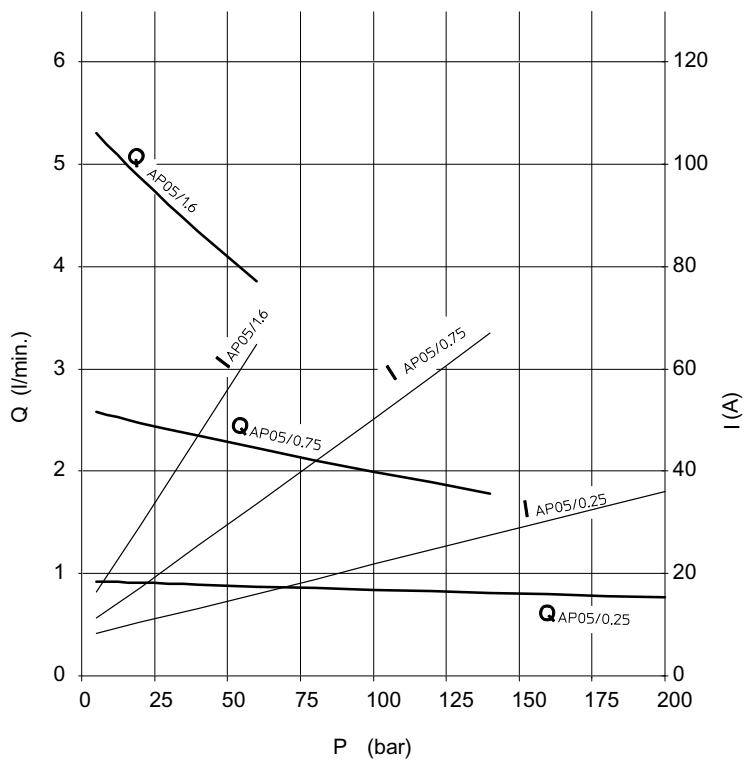
	Motor		Motor with relay			
Rotation Reversible						
Type	12 V - 500 W	24 V - 500 W				
Code	C120PD/C0	C220PD/C0				
Relay						
Relay type						

Motor mounting position

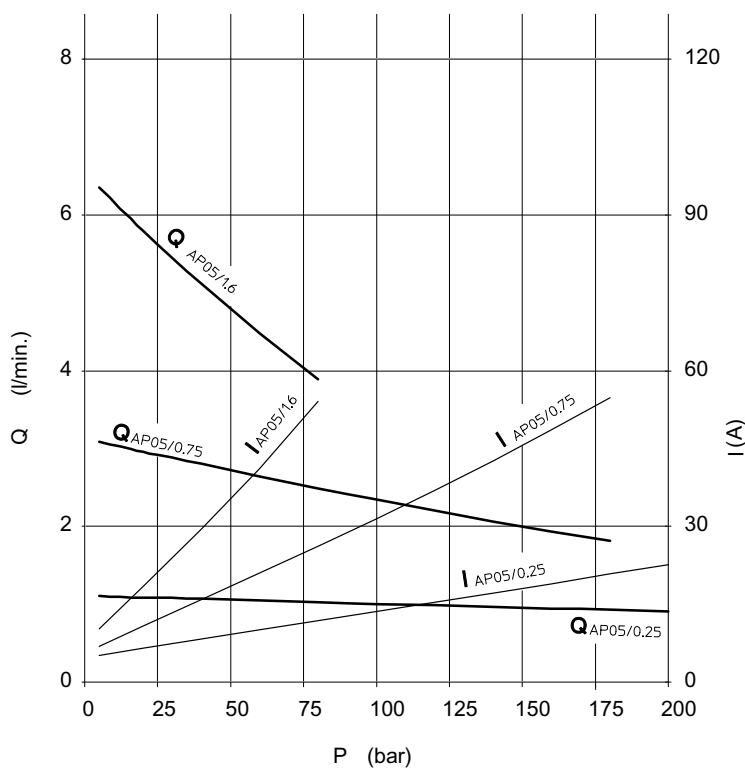
Standard positions



12 V - 500 W

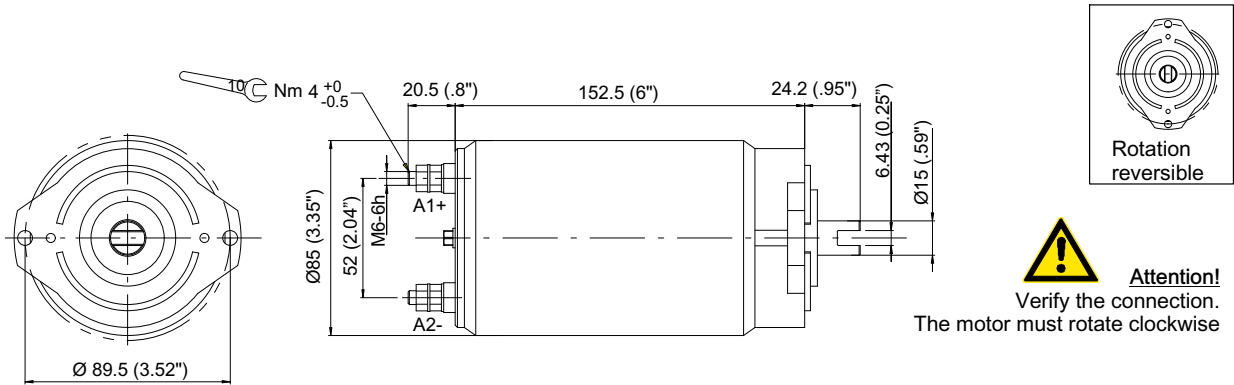


24 V - 500 W



Voltage	12 V	24 V
Nominal Power	800 W	800 W

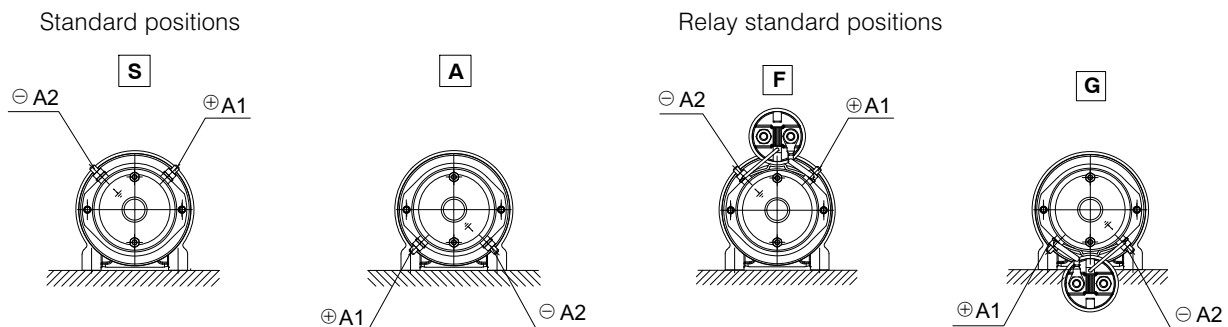
Protection index: IP54
 Insulation class: F
 Type of winding: Permanent magnets
 Relay fixing kit 200709000090
 Minimum brushes length: 5 mm (0.2 inches)



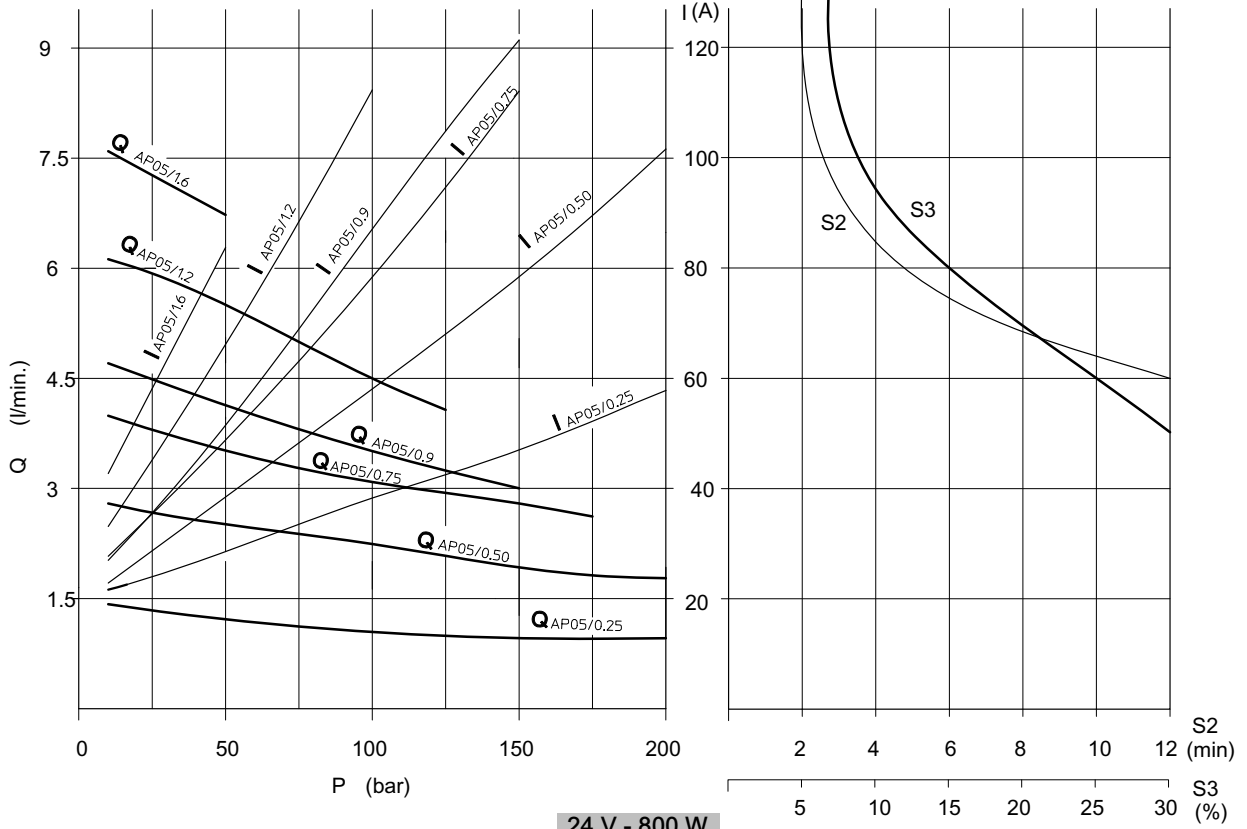
Weight: 3.70 Kg (8.15 lb)

Rotation reversible	Motor		Motor with relay	
Rotation reversible	12 V - 800 W	24 V - 800 W	12 V - 800 W	24 V - 800 W
Type	C128PK/A0	C228PK/A0	C128PK/A0 + R109	C228PK/A0 + R215
Code	200543912809	200543922801	200763310270	200763320300
Relay			STANDARD	
Relay type			R109	R215

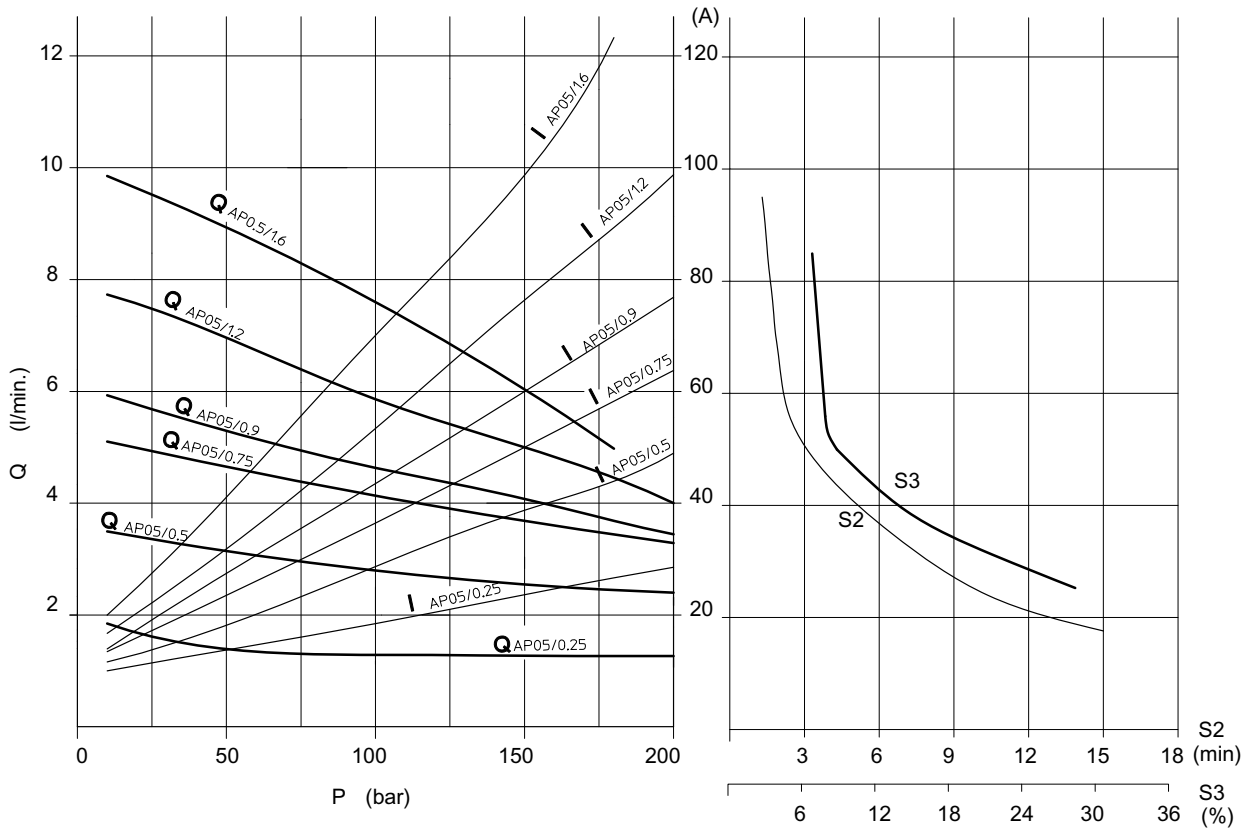
Motor mounting position



12 V - 800 W



24 V - 800 W



7 Drive and connecting flange for group 05 pumps

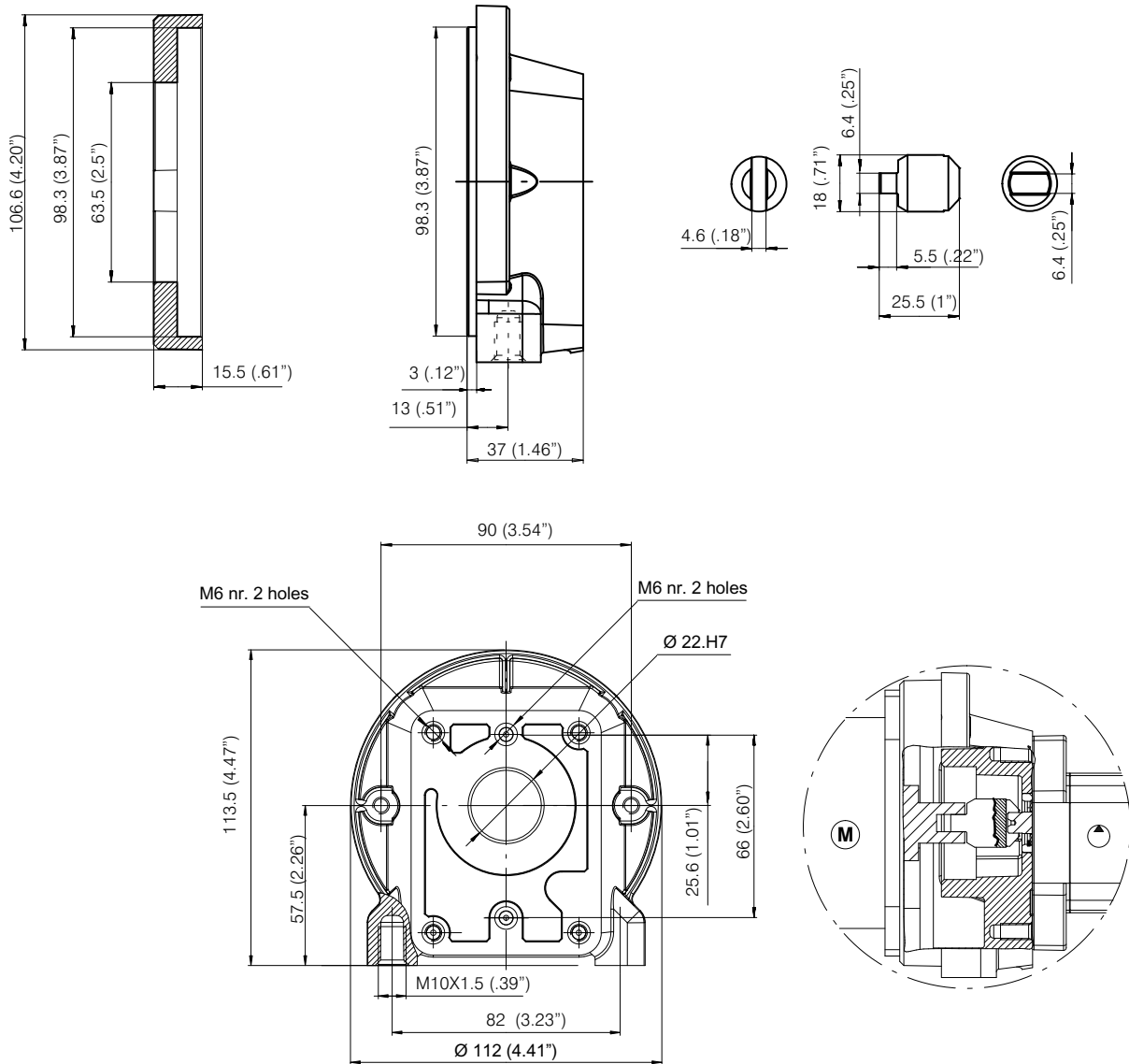
E56

E56 code: 200760400320

Adaptor code: 200658100030

Connecting flange code: 200658100010

Coupling code: 200659600260

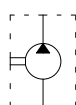


The complete code includes also:

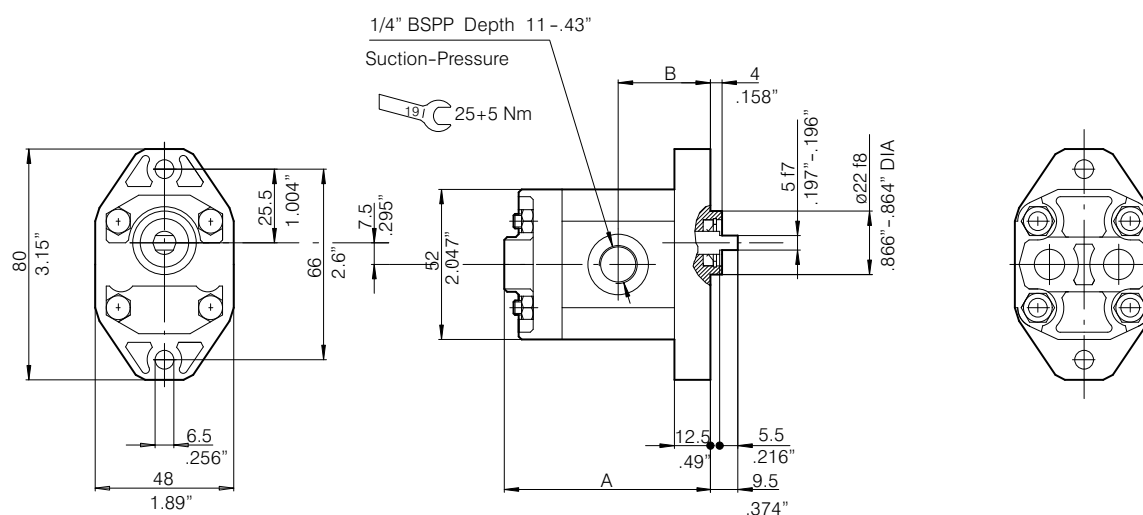
- + 2 screw code: 200521603015 (M006x035)
- + 2 screw code: 200521603012 (M006x022)
- + 4 washer code: 200530390611

8 Group 05 gear pumps

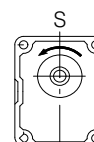
AP05 Type	Displacement		Max. pressure						n min.		n max.	
	cm ³ /rev	Cu. In. P. R.	P1		P2		P3		P ≤ P1	P > P1	P ≤ P1	P > P1
			bar	P.S.I.	bar	P.S.I.	bar	P.S.I.				
AP05/0.25	0.25	.015	170	2400	180	2600	200	2900	800	1000	6000	7000
AP05/0.5	0.5	.030	190	2700	210	3000	230	3300	650	800	6000	7000
AP05/0.75	0.75	.045	190	2700	210	3000	230	3300	650	800	6000	7000
AP05/0.9	0.9	.055	190	2700	210	3000	230	3300	650	800	6000	7000
AP05/1.2	1.2	.073	170	2400	180	2600	200	2900	550	700	5000	6000
AP05/1.6	1.6	.097	170	2400	180	2600	200	2900	550	700	5000	6000

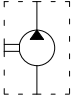


Group **AP05** Code **819**



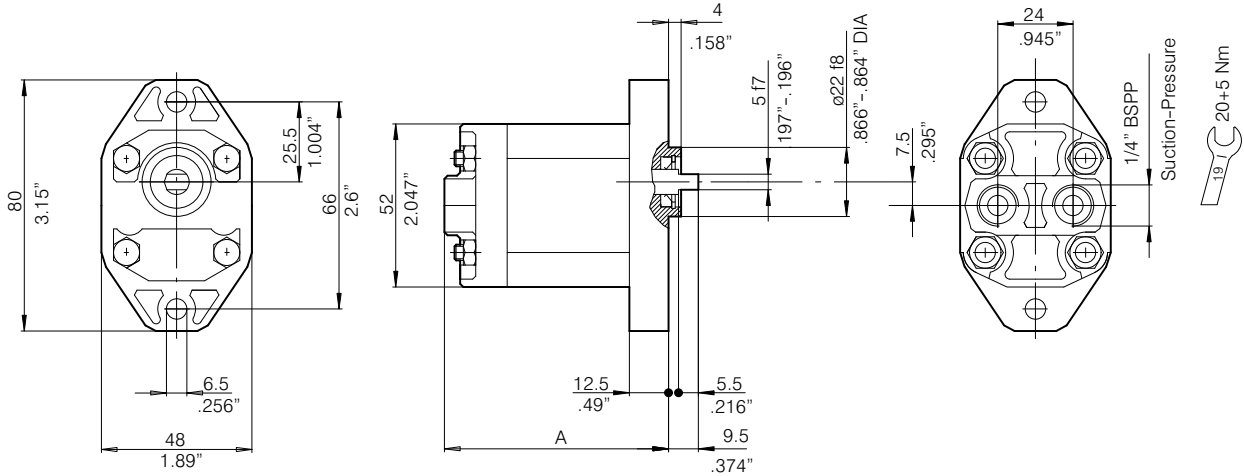
Type	Displacement cm ³ /rev	Dimensions				Order code Counterclockwise rotation: S
		A		B		
		mm	inches	mm	inches	
AP05/0.25	0.25	64.5	2.54	29	1.41	200100264304
AP05/0.5	0.5	67	2.64	30.5	1.2	200100364302
AP05/0.75	0.75	69	2.72	31.5	1.24	200100464302
AP05/0.9	0.9	70.5	2.77	32.3	1.26	200100564304
AP05/1.2	1.2	73	2.87	33.5	1.32	200100664302
AP05/1.6	1.6	77	3.03	35.5	1.40	200100864301



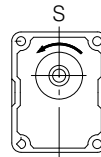


Group **AP05**

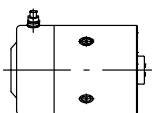

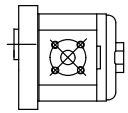
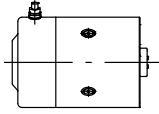
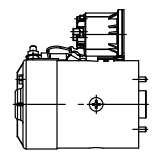
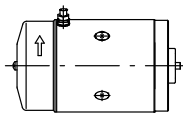
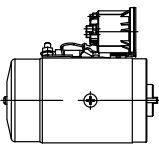
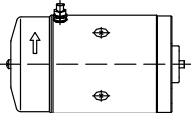
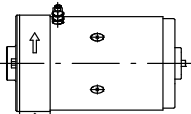
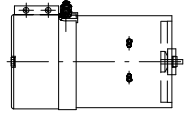
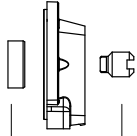
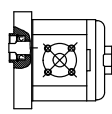
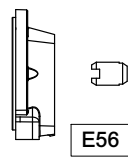
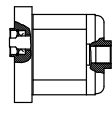
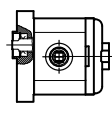
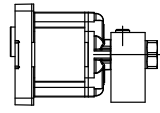
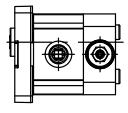
Code **319**



Type	Displacement cm ³ /rev	Dimensions		Order code Counterclockwise rotation: S
		A		
		mm	inches	
AP05/0.25	0.25	64.5	2.54	200100214301
AP05/0.5	0.5	67	2.64	200100314301
AP05/0.75	0.75	69	2.72	200100414301
AP05/0.9	0.9	70.5	2.77	200100514301
AP05/1.2	1.2	73	2.87	200100614301
AP05/1.6	1.6	77	3.03	200100814301



9 Electro-Motor-Pumps for group 1 pumps

Motor	Drive/Flange	Pump
		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>Without starting relay</p>  <p>12V-1600W 24V-2200W</p> <p>C135AB/H0 C240AB/S0</p> </div> <div style="text-align: center;"> <p>With starting relay</p>  <p>C135AB/H0 + R109 C240AB/S0 + R215</p> </div> </div>		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>12V-1500W 24V-2000W</p> <p>C134AK/O0 C238AK/P0</p> </div> <div style="text-align: center;">  <p>C134AK/O0 + R109 C238AK/P0 + R215</p> </div> </div>		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>48V-2000W</p> <p>T82K</p> </div> </div>		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>24V-3000W</p> <p>T106K*</p> </div> </div>		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>24V-3000W</p> <p>C248AK/Z0*</p> </div> </div>		
<div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>E45</p> </div> </div>		<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>AP100 - 219</p> </div>
<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>E56</p> </div>		<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>AP100 - 319</p> </div>
<p style="text-align: center;">*</p> <p style="text-align: center;">please contact our Sales Centre</p>		<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>AP100 - 819</p> </div>
<p style="text-align: center;">*</p> <p style="text-align: center;">please contact our Sales Centre</p>		<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>AP100 - 319 with VMI</p> </div>
<p style="text-align: center;">*</p> <p style="text-align: center;">please contact our Sales Centre</p>		<div style="display: flex; justify-content: center; margin-top: 20px;">  <p>AP100 - 819 with VMI</p> </div>

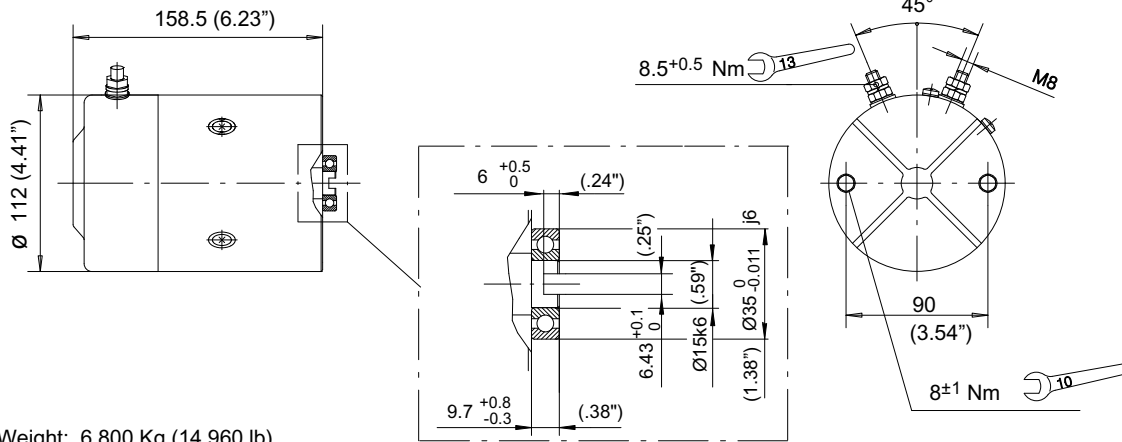
El. motor	E45	E56
C135AB/H0	●	
C135AB/H0+R109	●	
C240AB/S0	●	
C240AB/S0+R215	●	
C134AK/O0		●
C134AK/O0+R109		●
C238AK/P0		●

El. motor	E45	E56
C238AK/P0+R215		●
T82K		●
T106K *	* Please contact our Sales Centres	
C248AK/Z0*	* Please contact our Sales Centres	

10 D.C. Electric motors for group 1 pumps

Voltage	12 V	24 V
Nominal Power	1600 W	2200 W

Protection index: IP44 (12 V) - IP54 (24 V)
 Insulation class: F
 Type of winding: Compound
 Brushes kit: (12/1600) 200544138022
 (24/2200) 200544138023
 Minimum brushes length: 12.5 mm (0.5 inches)

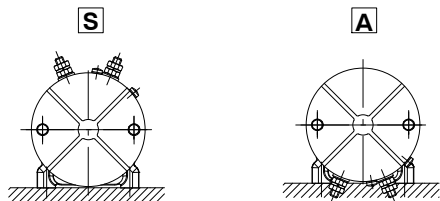


Weight: 6.800 Kg (14.960 lb)

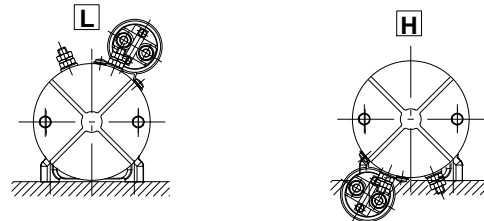
	Motor		Motor with relay			
Rotation Right						
Type	12 V - 1600 W	24 V - 2200 W	12 V - 1600 W	24 V - 2200 W		
Type	C135AB/H0	C240AB/S0	C135AB/H0 +R109	C240AB/S0 +R215		
Code	200543913706	200543924007	200763310240	200763310330		
Relay			Standard			
Relay type			R109	R215		

Motor mounting position

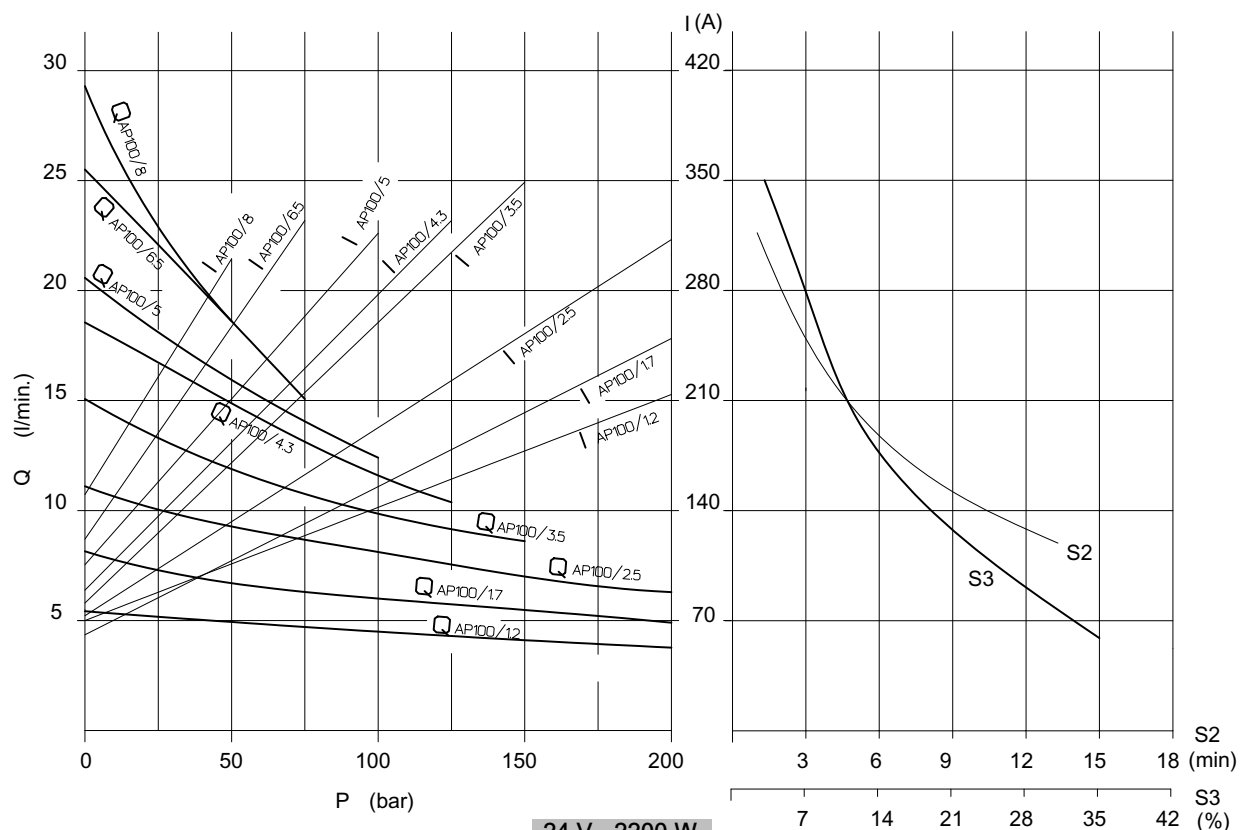
Standard positions



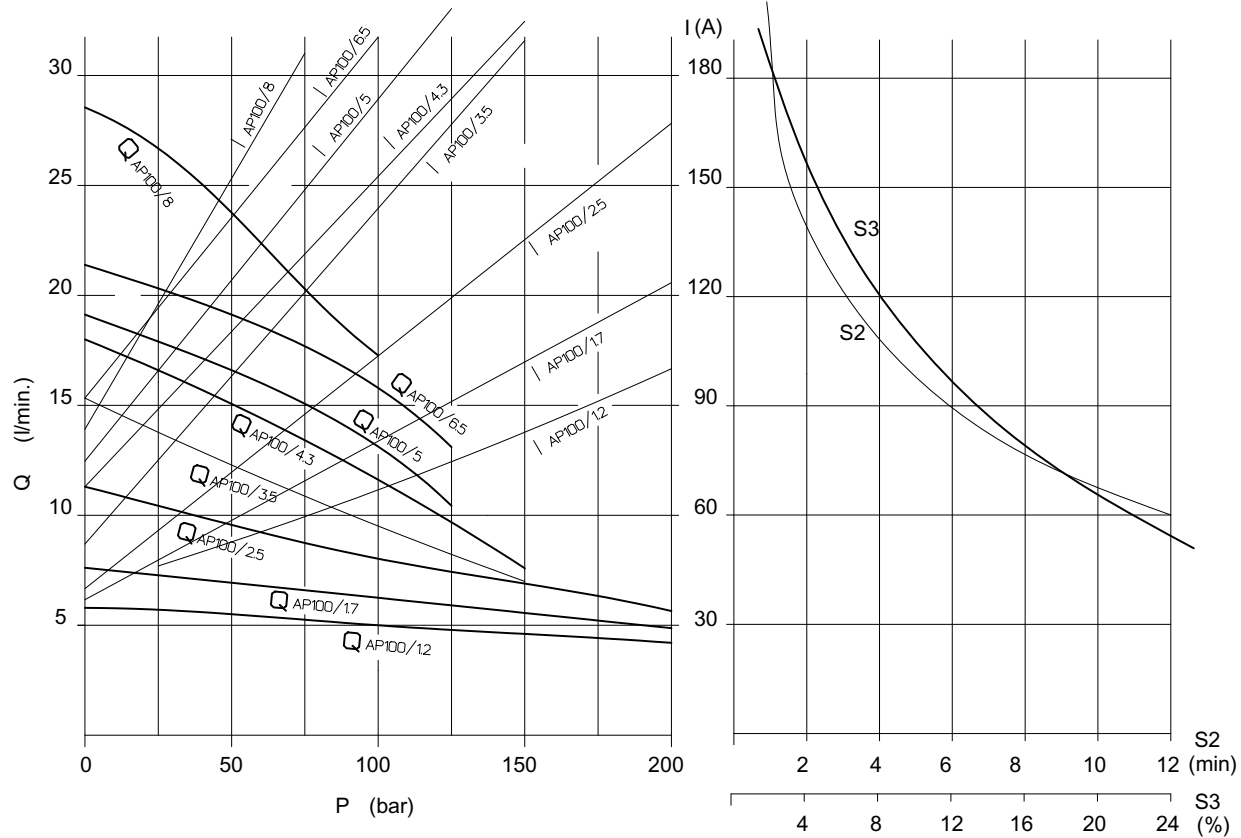
Relay standard positions



12 V - 1600 W

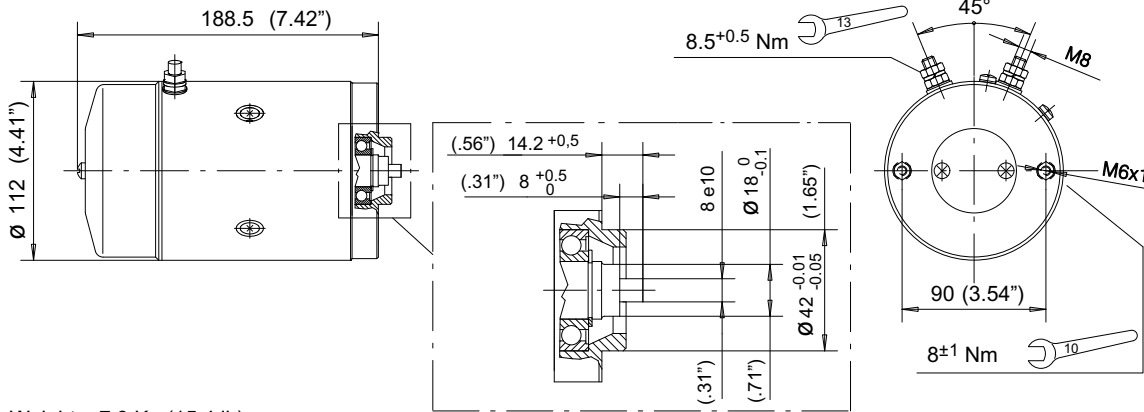


24 V - 2200 W



Voltage	12 V	24 V
Nominal Power	1500 W	2000 W

Protection index: IP54
 Insulation class: F
 Type of winding: Compound
 Brushes kit: (12/1500) 200544138016
 (24/2000) 200544138015
 Minimum brushes length: 12.5 mm (0.5 inches)

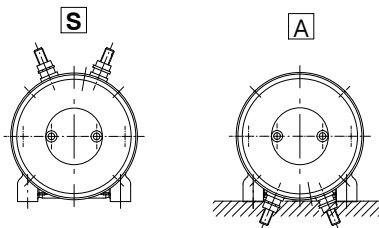


Weight : 7.3 Kg (15.4 lb)

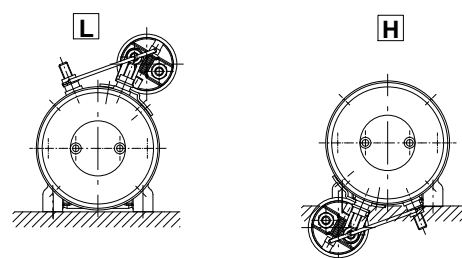
	Motor		Motor with relay	
Rotation Right				
Type	C134AK/O0	C238AK/P0	C134AK/O0 + R109	C238AK/P0 + R215
Code	200543913416	200543923813	200763310260	200763320250
Relay			Standard	
Relay type			R109	R215

Motor mounting position

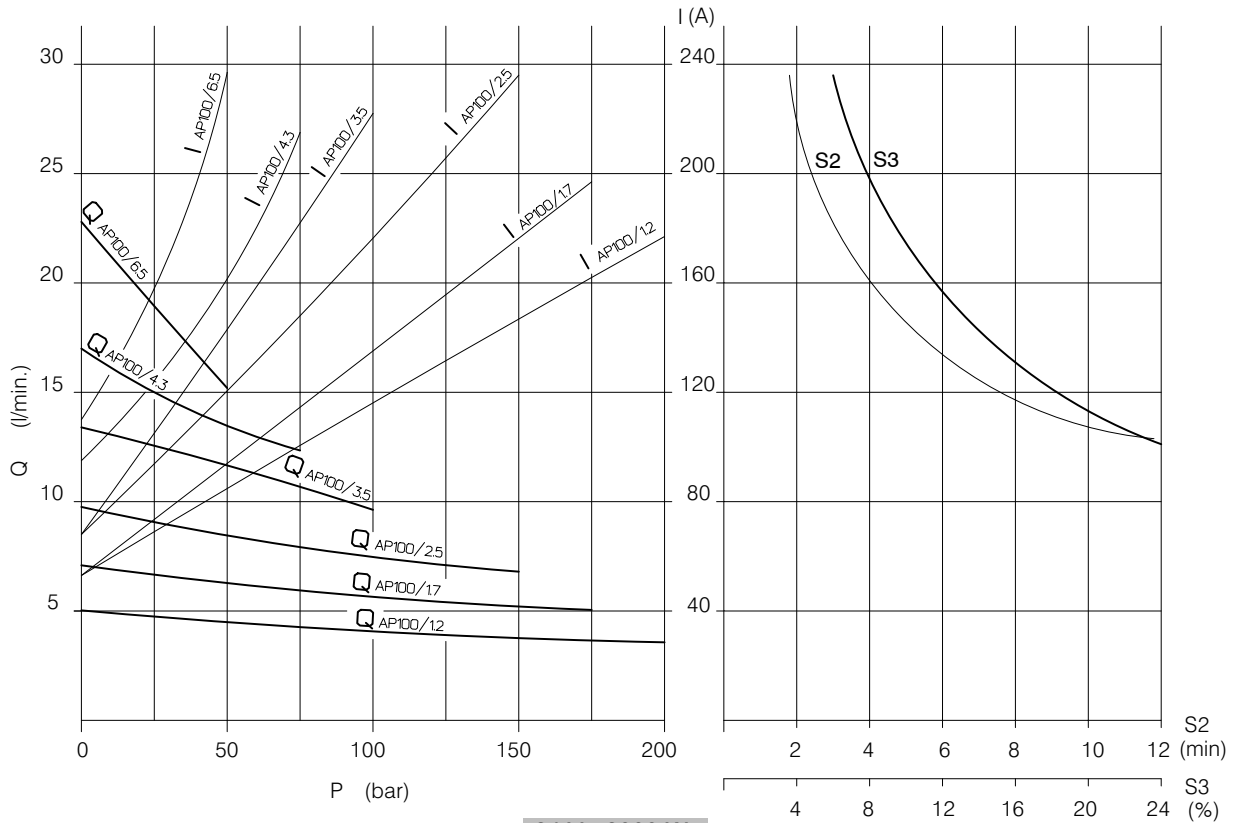
Standard positions



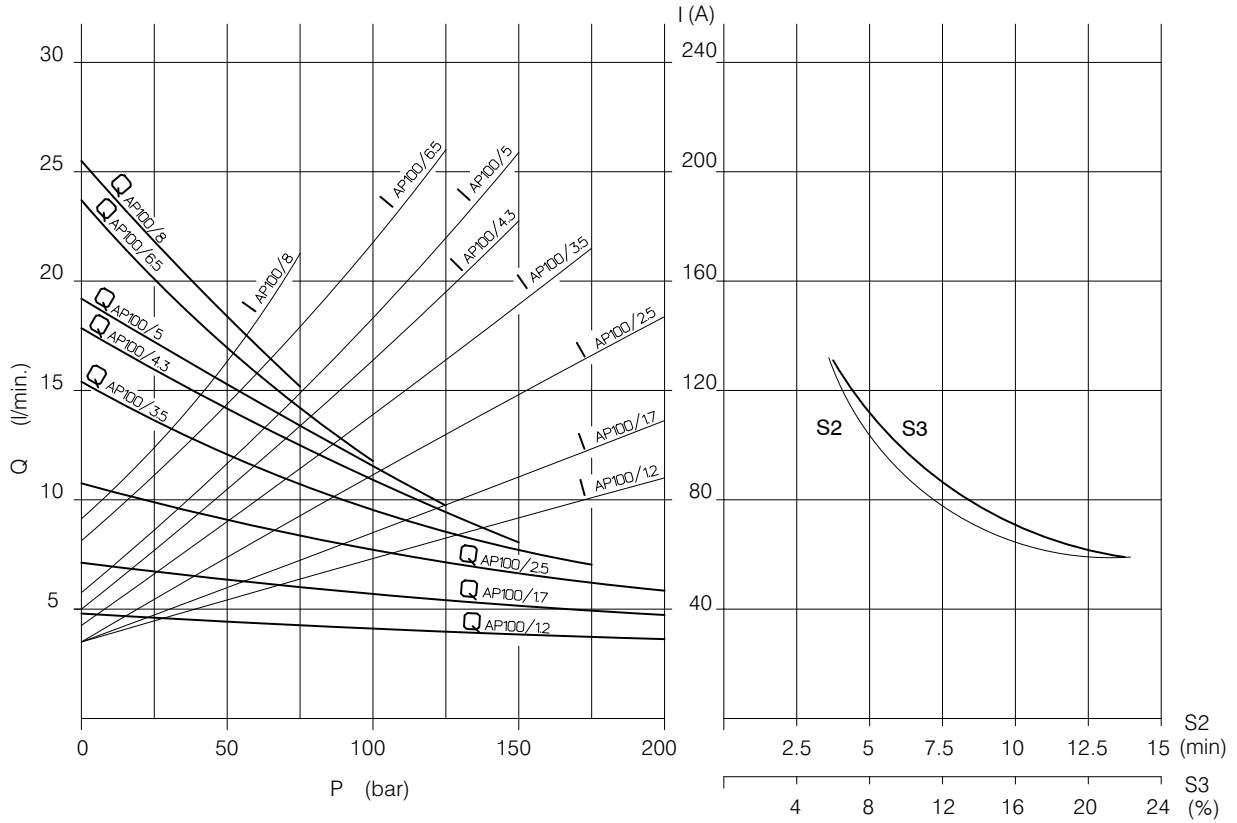
Relay standard positions



12 V - 1500 W

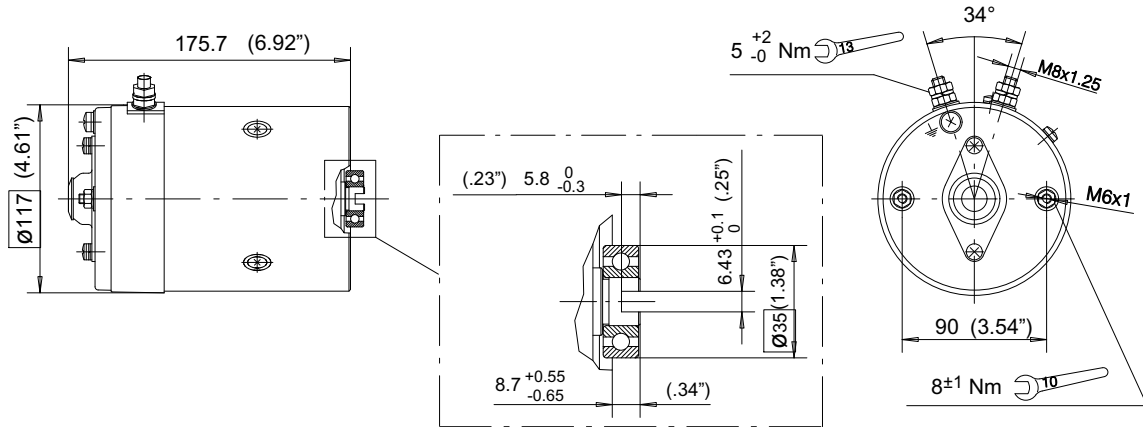


24 V - 2000 W



Voltage	12 V	24 V
Nominal Power	1700 W	2200 W

Protection index: IP44
 Insulation class: B
 Type of winding: Compound
 Brushes kit: (12/2000-24/2500) 200544138012
 Minimum Brushes length: 5 mm (0.2 inches)

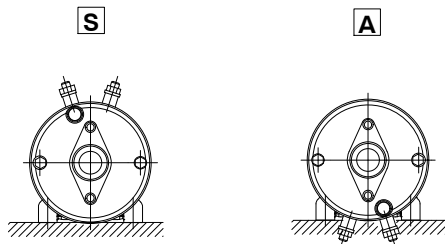


Weight : 8 Kg (17.5 lb)

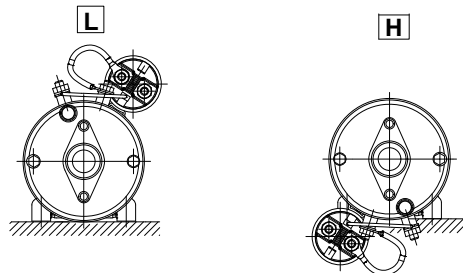
	Motor		Motor with relay	
Rotation Right				
Type	T107E	T109E	T107E +R109	T109E + R215
Code	200543913806	200543924205	200763310210	200763320290
Relay			Standard	
Relay type			R109	R215

Motor mounting position

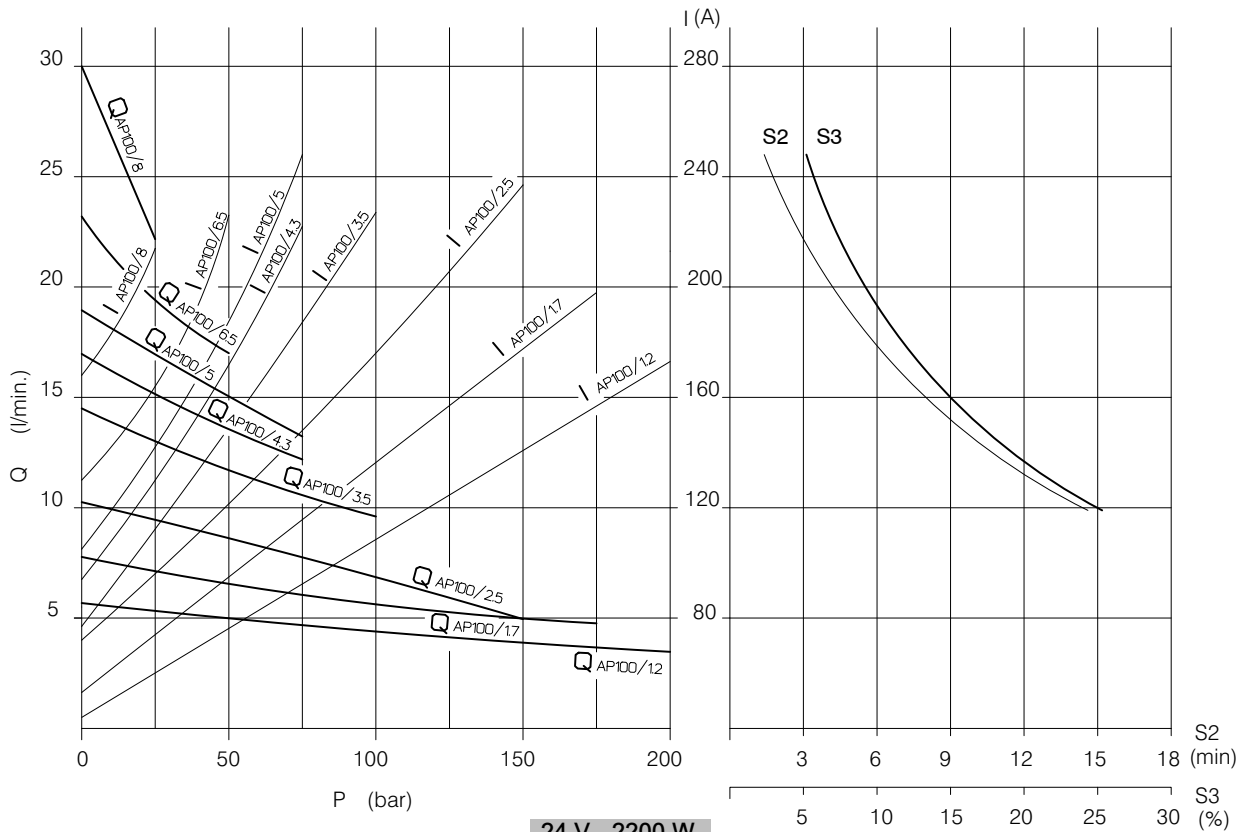
Standard positions



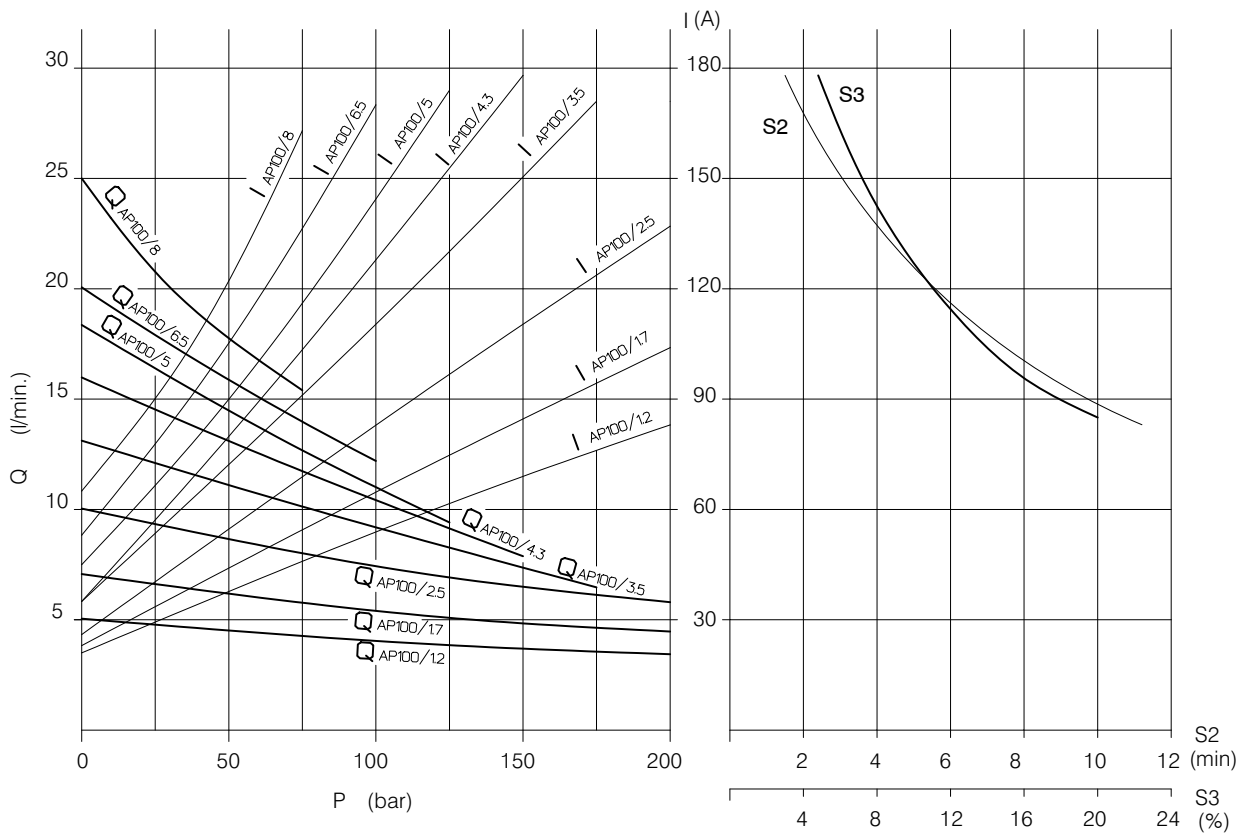
Relay standard positions



12 V - 1700 W

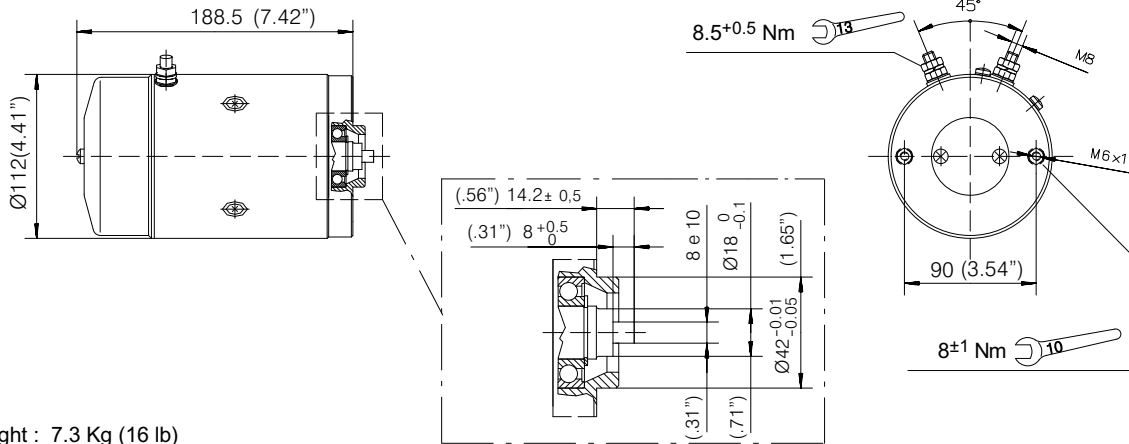


24 V - 2200 W

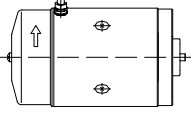
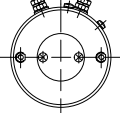


Voltage	48V
Nominal Power	2000 W

Protection index: IP54
 Insulation class: F
 Type of winding: Compound
 Brushes kit: 200544138018
 Minimum brushes length: 12.5 mm (0.5 inches)

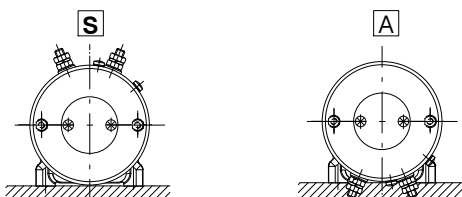


Weight : 7.3 Kg (16 lb)

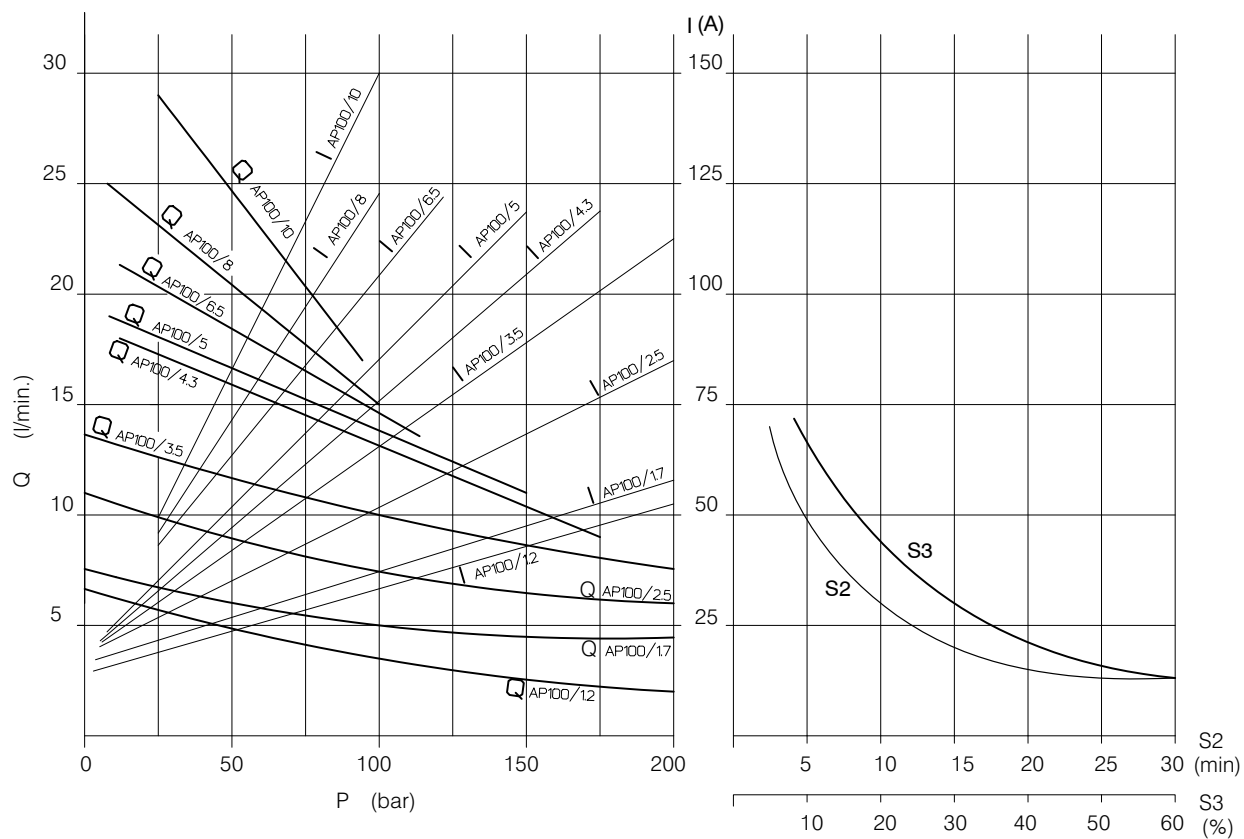
	Motor	Motor with relay			
Rotation Right					
Type	48 V - 2000 W				
Code	T82K				
Relay	200543933803				
Relay type					

Motor mounting position

Standard positions

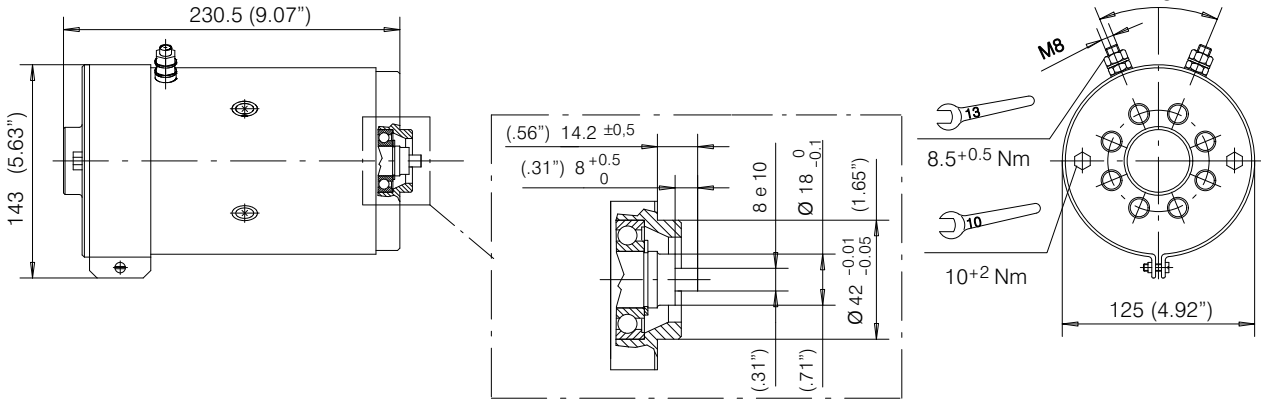


48 V - 2000 W


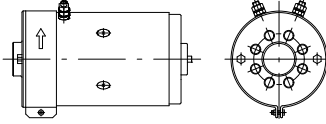


Voltage	Nominal Power
24 V	3000 W

Protection index: IP44
 Insulation class: F
 Type of winding: Compound
 Brushes kit: 200.5441.38011
 Minimum brushes length: 15 mm (0.6 inches)

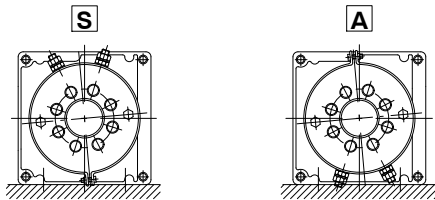


Weight : 12 Kg (26.4 lb)

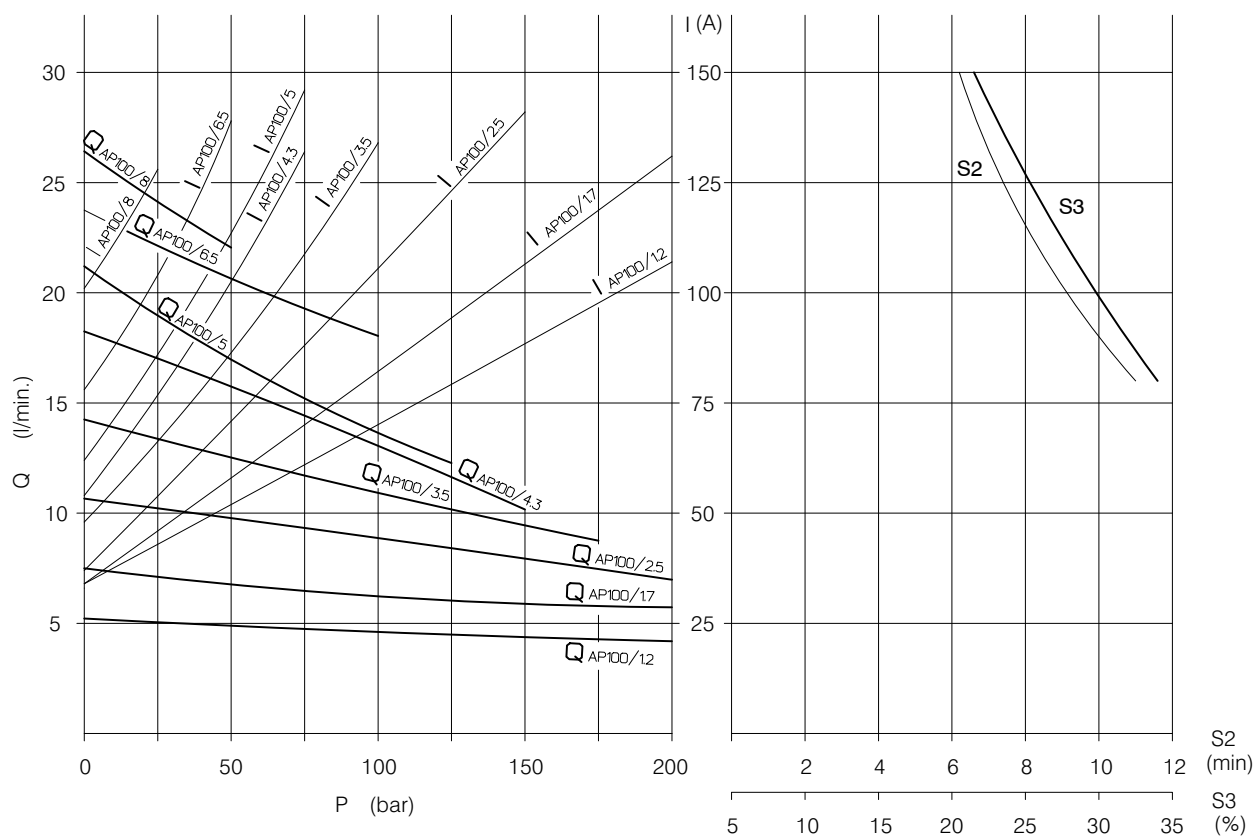
	Motor	Motor with relay	
 Rotation Right			
Type	24 V - 3000 W		
Code	T106K		
Relay	200543924806		
Relay type			

Motor mounting position

Standard positions

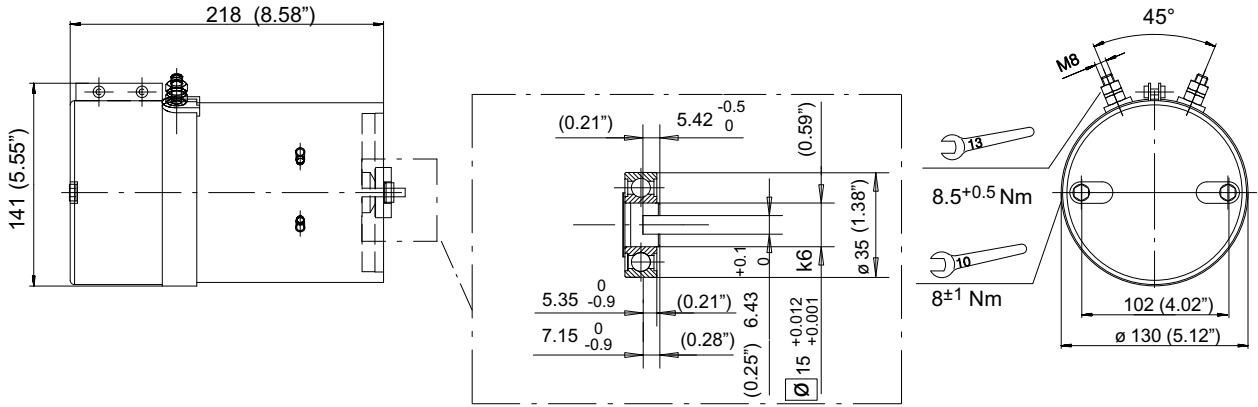


24 V – 3000 W



Voltage	Nominal Power
24 V	3000 W

Protection index: IP43
 Insulation class: F
 Type of winding: Compound
 Brushes kit: 200544138029
 Minimum brushes length: 15 mm (0.6 inches)

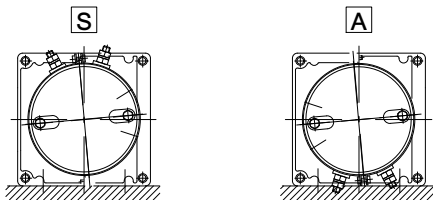


Weight : 12 Kg (26.4 lb)

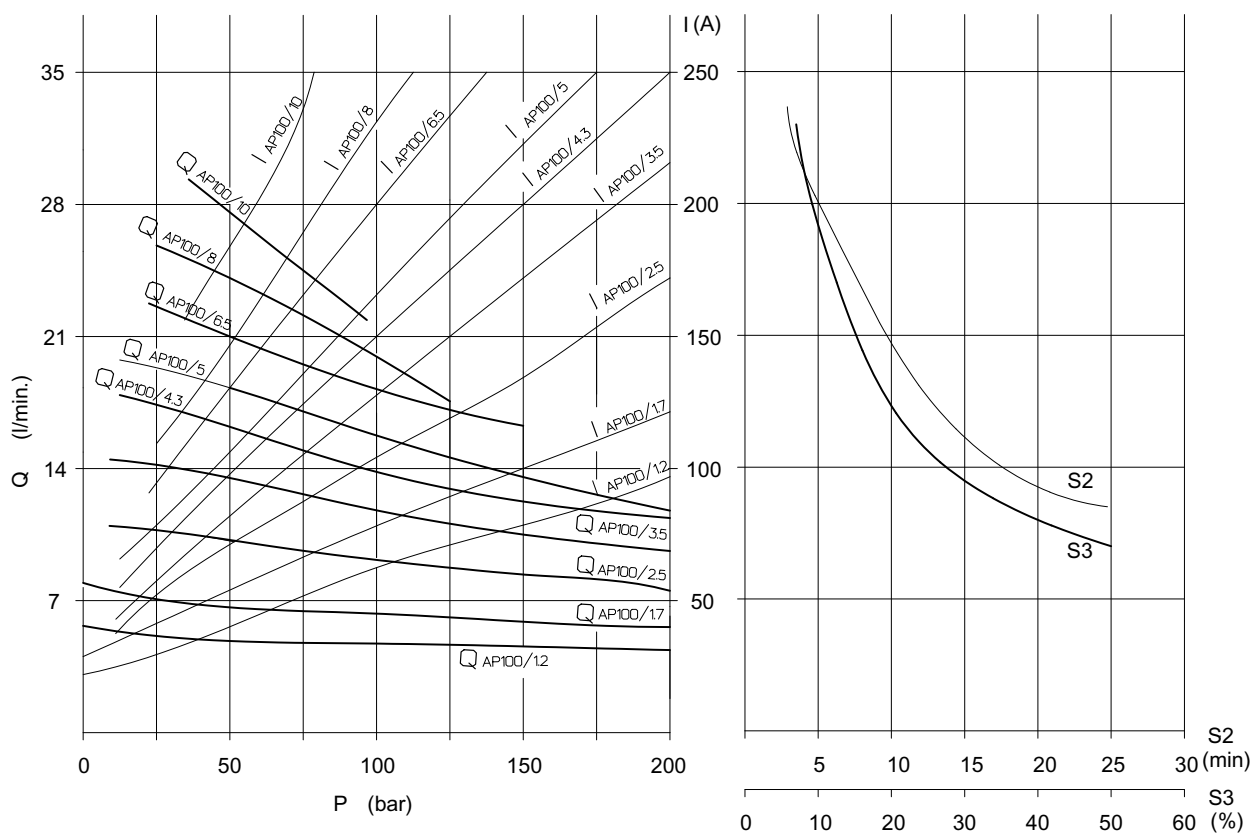
	Motor	Motor with relay	
 Rotation Right			
Type	24 V - 3000 W		
Code	C248AK/Z0		
Relay	200543924601		
Relay type			

Motor mounting position

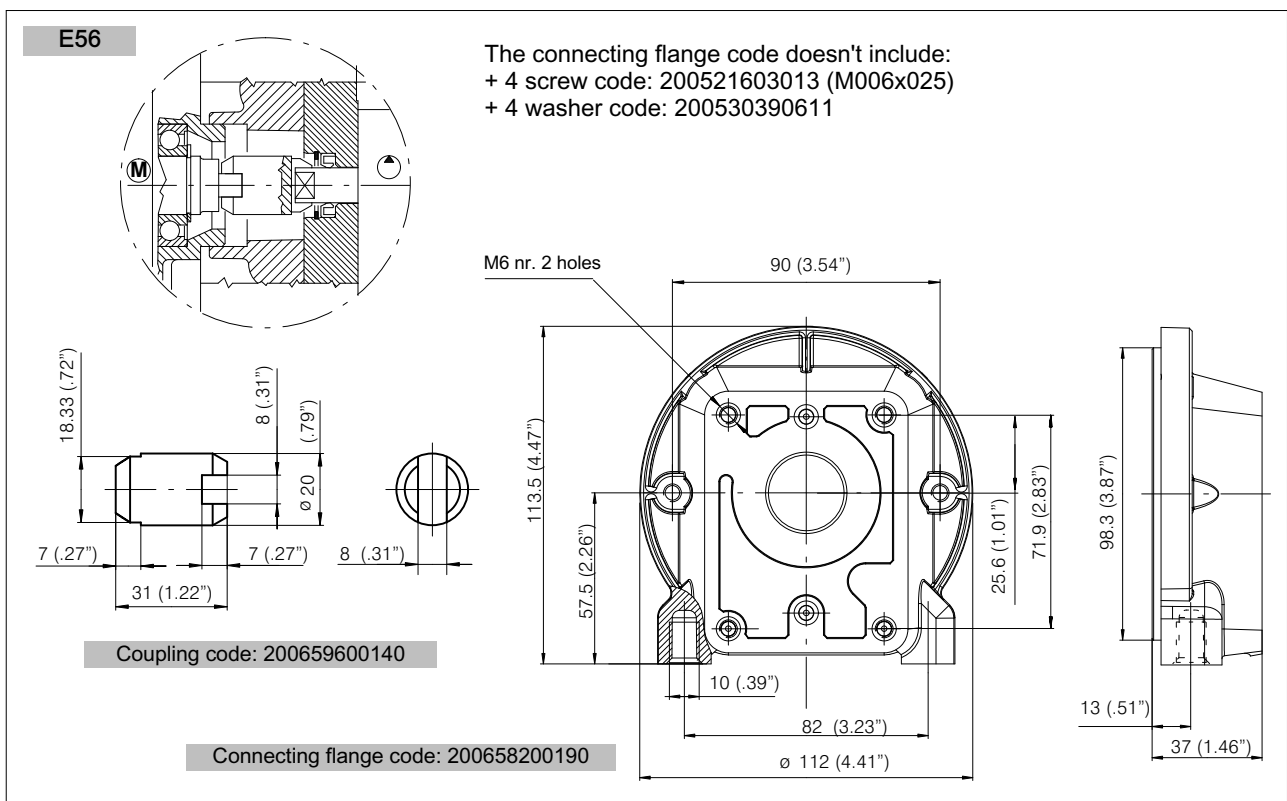
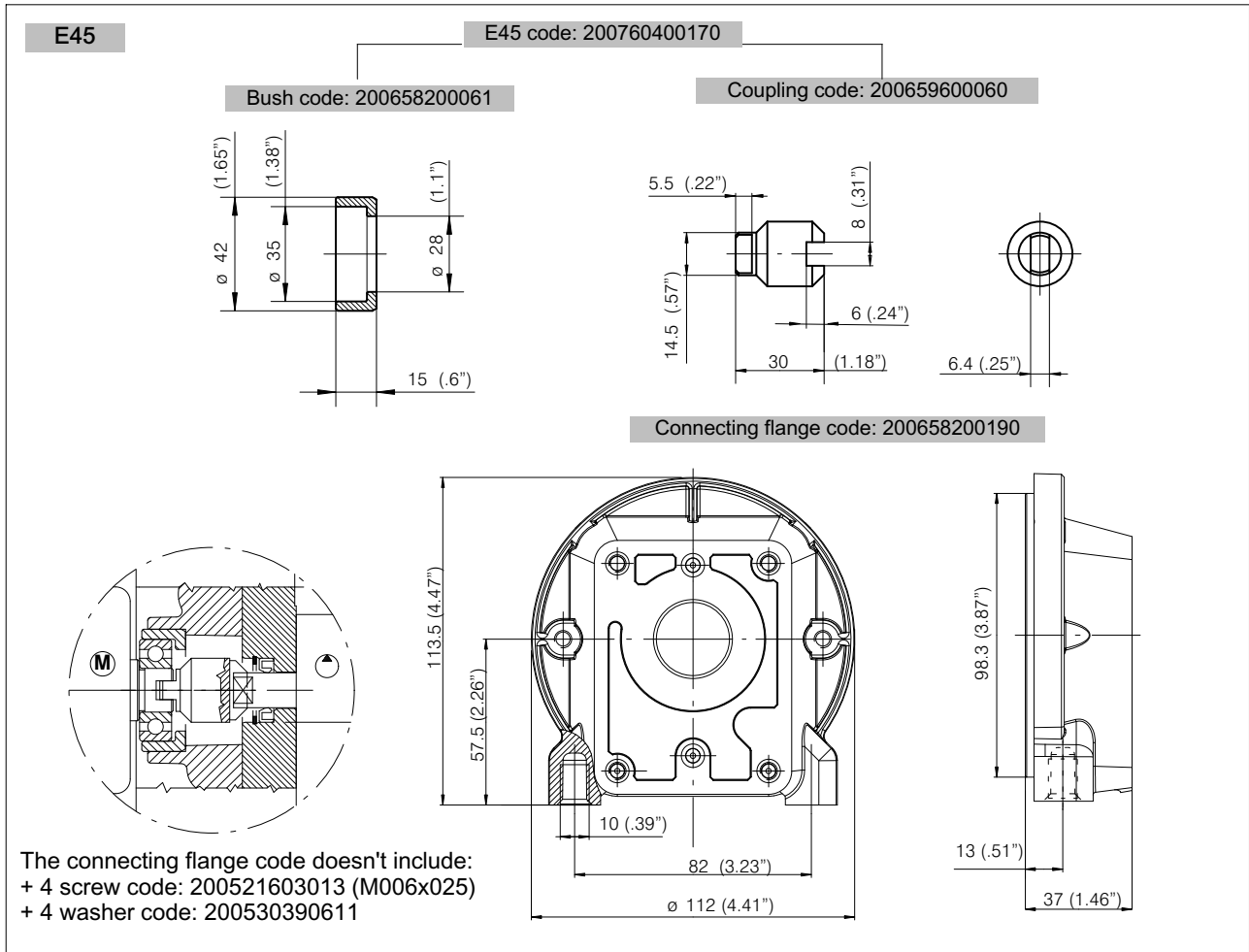
Standard positions



24 V - 3000 W

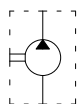


11 Drives and connecting flange for group 1 pumps

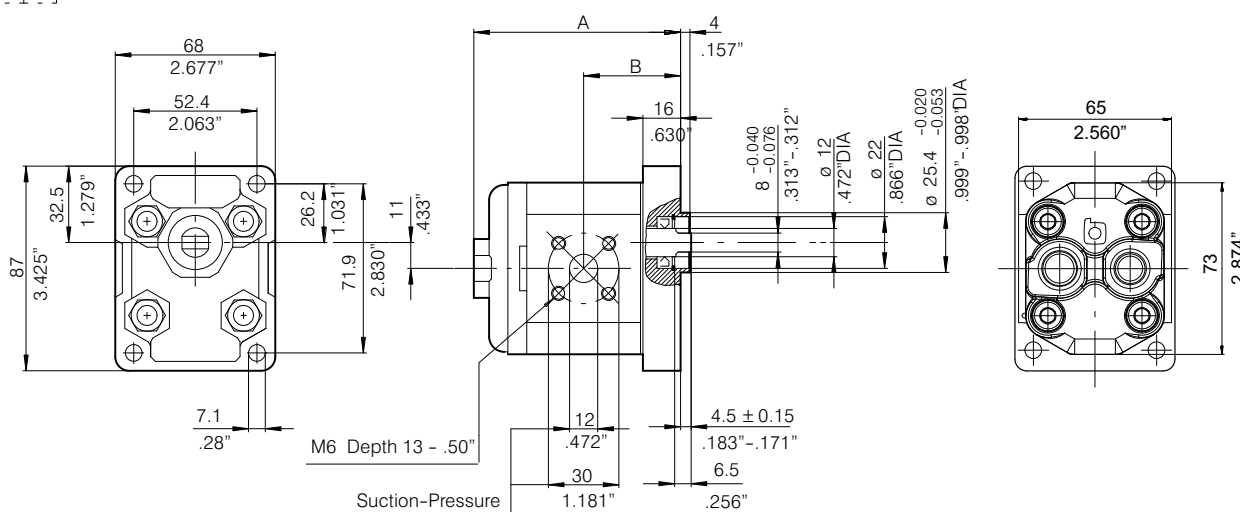


12 Group 1 gear pumps

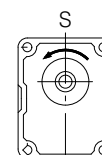
AP100 Type	Displacement		Max. pressure						n min.		n max.	
	cm ³ /rev	Cu. In. P. R.	P1		P2		P3		P ≤ P1	P > P1	P ≤ P1	P > P1
			bar	P.S.I.	bar	P.S.I.	bar	P.S.I.				
AP100/1.2	1.2	.073	210	3000	250	3600	280	4000	800	1000	4500	5000
AP100/1.7	1.7	.103	210	3000	250	3600	280	4000	650	800	4500	5000
AP100/2.5	2.5	.152	210	3000	250	3600	280	4000	650	800	4500	5000
AP100/3.5	3.5	.213	210	3000	230	3300	250	3600	650	800	3500	4000
AP100/4.3	4.3	.262	210	3000	230	3300	250	3600	550	700	3500	4000
AP100/5	5.0	.305	210	3000	230	3300	250	3600	500	650	3000	3500
AP100/6.5	6.5	.396	190	2700	220	3150	240	3400	500	650	2500	3000
AP100/8	7.8	.476	180	2600	210	3000	230	3300	500	650	2500	3000
AP100/10	10.0	.610	150	2150	180	2600	200	2900	500	650	2000	2500

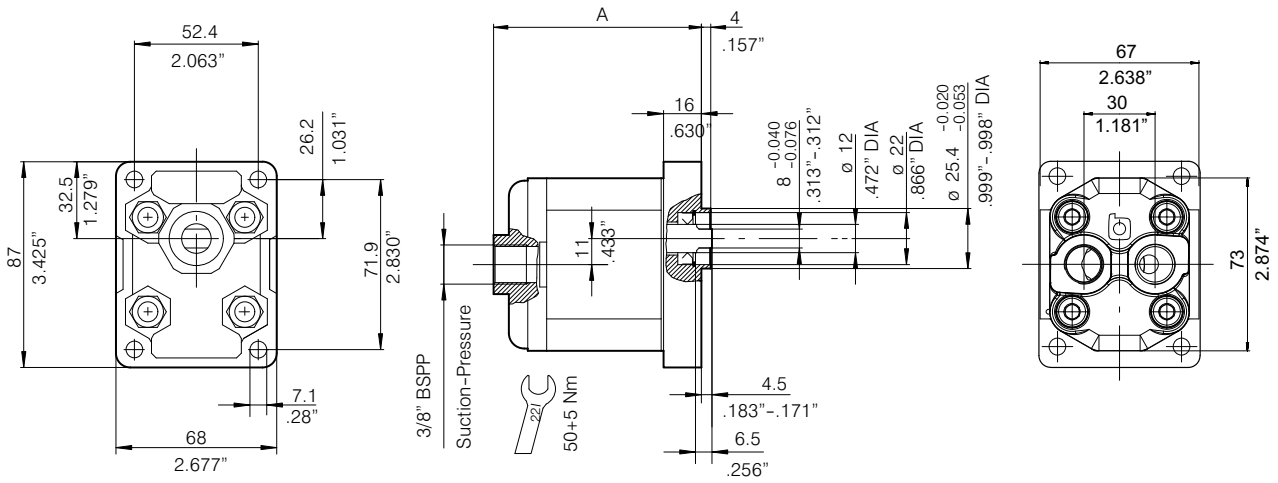
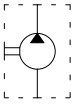


Group **AP100** Code **219**



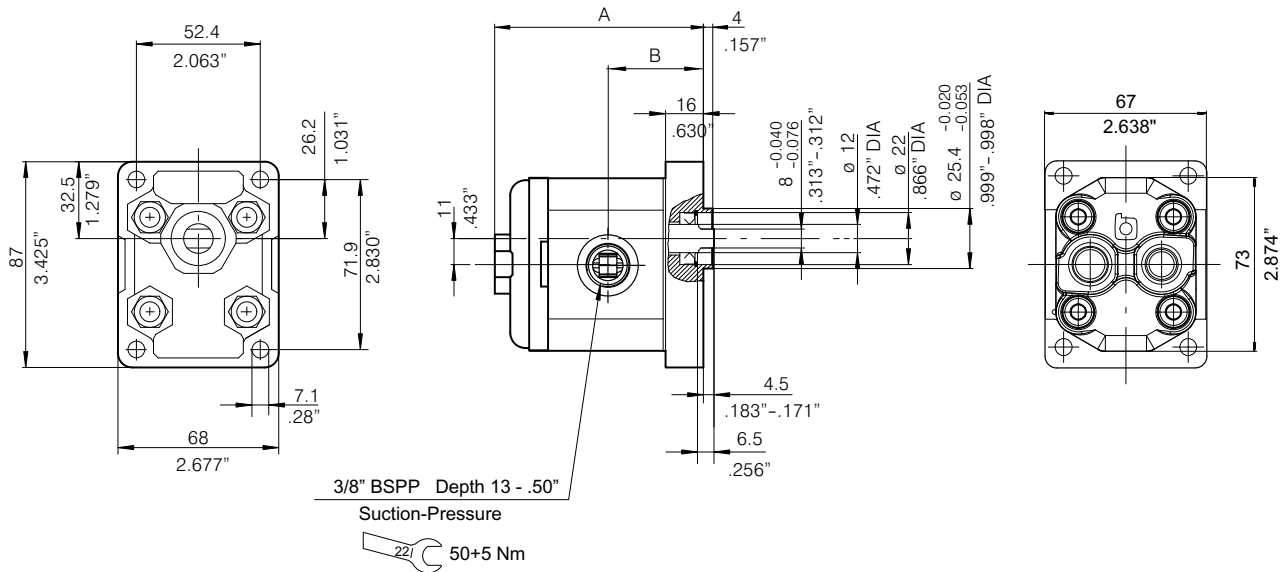
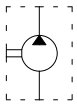
Type	Displacement cm ³ /rev	Dimensions				Order code Counterclockwise rotation: S
		mm	inches	mm	inches	
AP100/1.2	1.2	82.5	3.25	38.5	1.51	200101114306
AP100/1.7	1.7	84.5	3.33	39.5	1.55	200101214307
AP100/2.5	2.5	88	3.46	41	1.61	200101314306
AP100/3.5	3.5	92	3.62	43.5	1.71	200101414306
AP100/4.3	4.3	96	3.78	45	1.77	200101514306
AP100/5	5	98.5	3.88	46.5	1.83	200101614304
AP100/6.5	6.5	103.5	4.07	49	1.93	200101714304
AP100/8	7.8	109	4.29	52	2.05	200101814302
AP100/10	10	118	4.64	56.5	2.22	



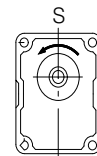


Type	Displacement cm ³ /rev	Dimensions		Order code
		mm	inches	
AP100/1.2	1.2	82.5	3.25	200101114307
AP100/1.7	1.7	84.5	3.33	200101214308
AP100/2.5	2.5	88	3.46	200101314307
AP100/3.5	3.5	92	3.62	200101414307
AP100/4.3	4.3	96	3.78	200101514308
AP100/5	5	98.5	3.88	200101614305
AP100/6.5	6.5	103.5	4.07	200101714305
AP100/8	7.8	109	4.29	200101814303
AP100/10	10	118	4.64	

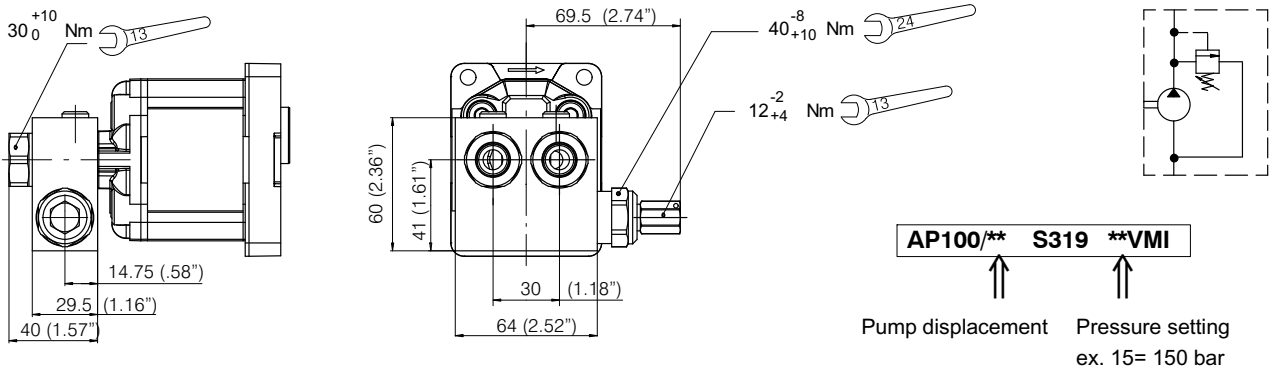
Counterclockwise rotation: S



Type	Displacement cm ³ /rev	Dimensions A		Dimensions B		Order code Counterclockwise rotation: S
		mm	inches	mm	inches	
AP100/1.2	1.2	82.5	3.25	38.5	1.51	
AP100/1.7	1.7	84.5	3.33	39.5	1.55	
AP100/2.5	2.5	88	3.46	41	1.61	200101314308
AP100/3.5	3.5	92	3.62	43.5	1.71	200101314308
AP100/4.3	4.3	96	3.78	45	1.77	
AP100/5	5	98.5	3.88	46.5	1.83	
AP100/6.5	6.5	103.5	4.07	49	1.93	
AP100/8	7.8	109	4.29	52	2.05	
AP100/10	10	118	4.64	56.5	2.22	

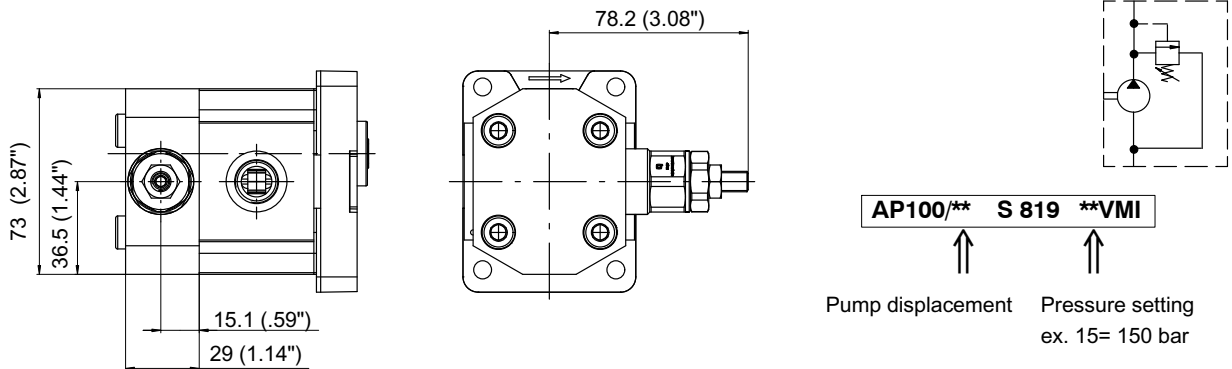


12.1 Special block with relief valve integrated



Block code (including valve and fittings)	Setting range
200987400450	30 - 95 bar
200987400910	95 - 210 bar

12.2 Back cover with relief valve integrated



Complete pump code	Setting valve range
200101214312	96 - 220 bar
200101214311	221 - 350 bar

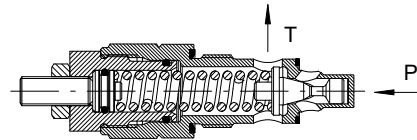
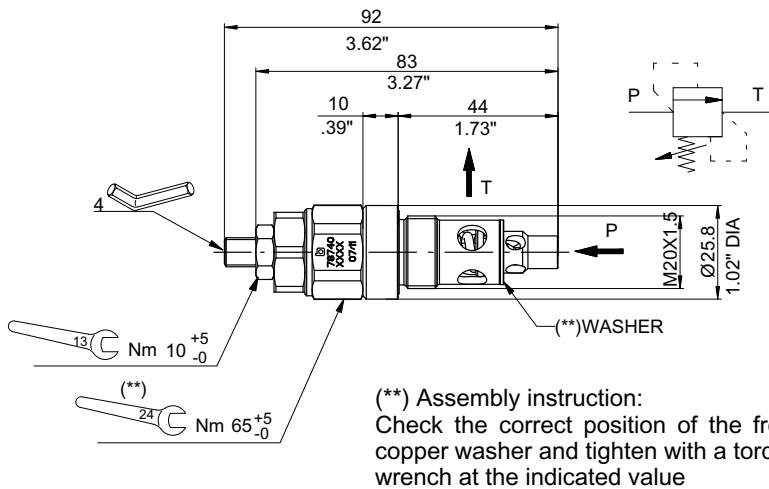
For relief valve setting and tightening torque values, see section 12.2.1

12.2.1 Pressure relief valve : **VM01C

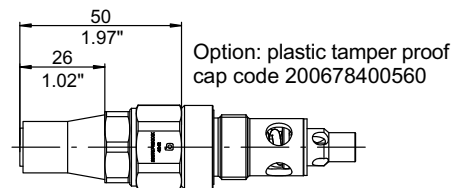
Direct acting
Balanced piston
Adjustable setting

Four setting ranges

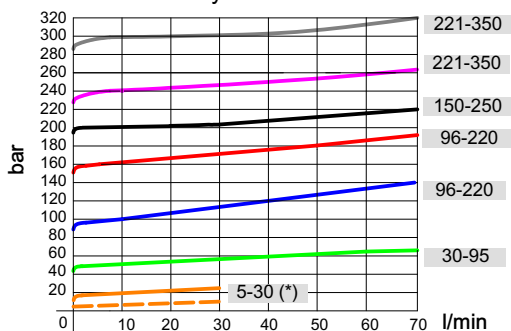
Max. Pressure 350 bar***
Max flow rate 60 l/min.
Temperature range -20/+100 °C
Weight: 0.155 Kg.



The valve can be sealed against tampering



Pressure viscosity characteristic 46 cSt at 40°C



(*) see performances trace/minimum pressure setting (---)

*** Maximum admitted pressure value: referred to valve only.
For max admitted values see pump limits.

Performances	
Max. flow	60 l/min.
Pressure setting flow	5 l/min
Max internal leakage	200 cm ³ /min at 80% of nominal pressure setting
Oil viscosity	12 to 400 cSt
Oil temperature	-20 to 100 °C
Recomanded filtration	21/19/16 (10 NAS 1638)
Marking info:	Printed code and date

The purpose of a relief valve is to keep the maximum system pressure at a safe level. When the external gear pump is supplied with pressure relief valves, the correct calibration is provided by Bucher Hydraulics S.p.A. and there are no reasons to change this value.

When ordering, state in full the sheath part number, and, if the valve is to be supplied with sheath already fitted, the relief pressure setting required.

Spring	Spring code	Setting range	Standard setting	Q max (l/min)	Type	Relief valve only code
00	-	Plugged	Without valve	-	00VC00	200978400140
02	200662403160	5 - 30 bar	20 bar	30 (*)	02VM01C	200787403600
05	200662403080	30 - 95 bar	50 bar	60	05VM01C	200787403480
12	200662403050	96 - 220 bar	120 bar	60	12VM01C	200787403420
15	200662403070	150 - 250 bar	150 bar	60	15VM01C	200787403470
23	200662403060	221 - 350 bar	230 bar	60	23VM01C	200787403430

Pressure setting valve referred to 5 l/min

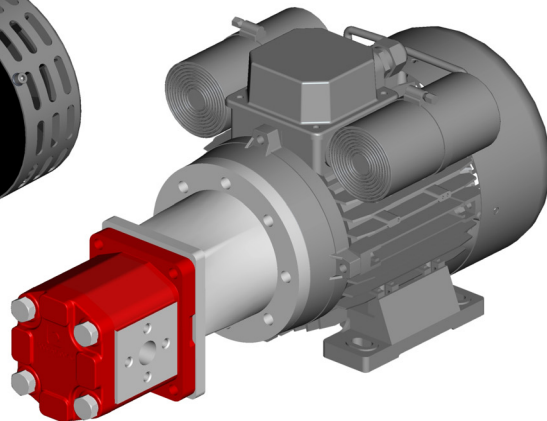
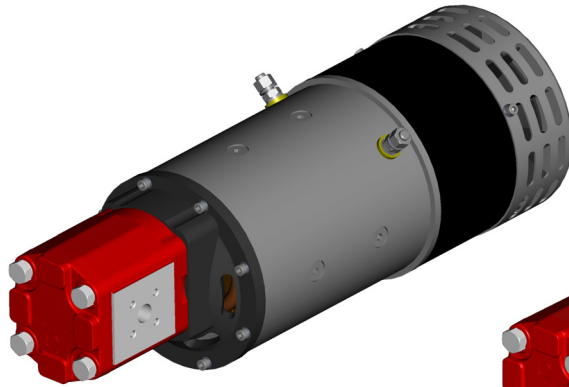
13 Group 2 gear pumps

Since Bucher produces a wide range of hydraulic external gear pumps we can offer also customized motor-pumps in larger size, for example with gear pumps of the group 2 (series AP212).

Below are represented just a few examples of motor-pumps combined with fan cooled and not fan cooled electric motors, both in DC and AC current.

The motor-pumps may also integrate different hydraulic circuits like pressure relief valve, flow control valve, etc, in order to simplify the customer circuit.

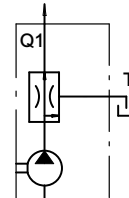
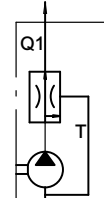
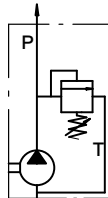
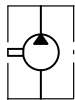
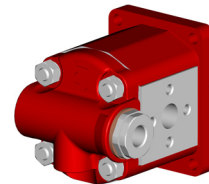
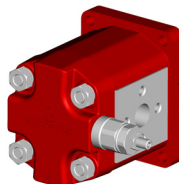
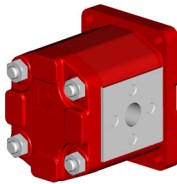
* Further information regarding AP212 pumps: see catalogue 200-P-991230-E. Please contact our Sales Centres for other information.



AP212 with standard back cover

AP212 with relief valve VM series

AP212 with flow regulator Q1 or QE series

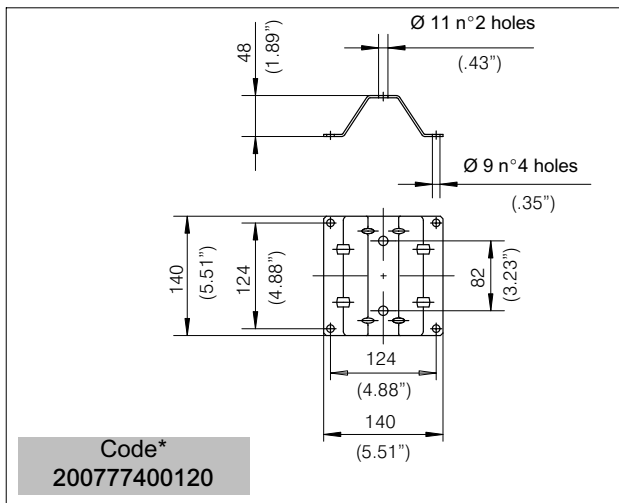


Type	AP/APR212 Displacement		AP/APR212LN Displacement		Max. pressure						n min. P2 < 100 bar rpm	n min. 100 < n < 180 bar rpm	n min. 180 < n < P2 rpm	n max. rpm
	cm ³ /rev	Cu.In. P.R.	cm ³ /rev	Cu.In. P.R.	P1 (continuous)		P2 (intermittent)		P3 (peak)					
					bar	P.S.I.	bar	P.S.I.	bar	P.S.I.				
4.5	4.4	.269	4.5	.275	250	3600	280	4000	300	4300	600	1200	1400	4000
6.5	6.4	.391	6.6	.403	250	3600	280	4000	300	4300	600	1200	1400	4000
8.5	8.4	.513	8.7	.531	250	3600	280	4000	300	4300	600	1000	1400	4000
11	11.1	.677	11.5	.702	250	3600	280	4000	300	4300	500	900	1200	3500
15	15.1	.921	15.7	.958	250	3600	280	4000	300	4300	500	750	1000	3500
19	19.2	1.172	19.8	1.208	210	3000	240	3500	260	3700	500	750	1000	3000
22	22.2	1.355	23	1.404	180	2600	210	3000	230	3300	500	750	900	3000
26	26.2	1.599	27.1	1.654	170	2500	200	2850	220	3150	500	750	1000	2800
22**	22.2	1.355	23	1.404	220	3150	240	3450	260	3700	500	750	900	3000
26**	26.2	1.599	27.1	1.654	200	2850	230	3300	250	3600	500	750	1000	2800

** obtained with a specific balancing plate, please contact our Sales Centres

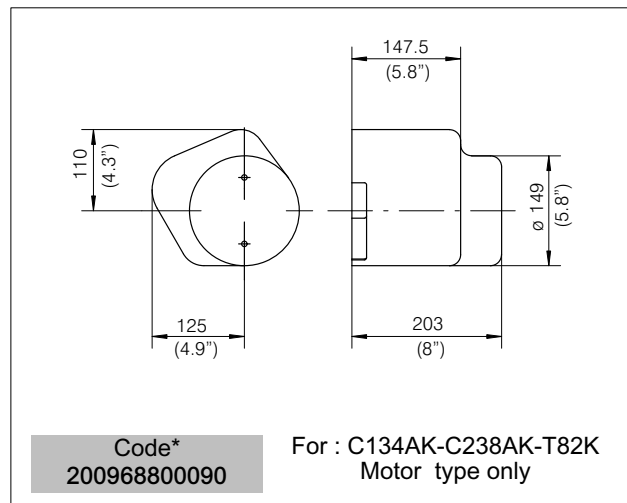
14 Components

14.1 Pressed steel bracket



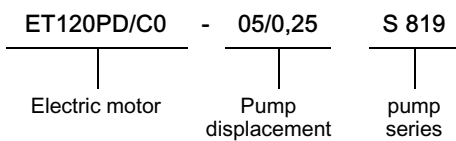
* Supplied with screws, washers and nuts too

14.2 Protective cover for D.C. motors

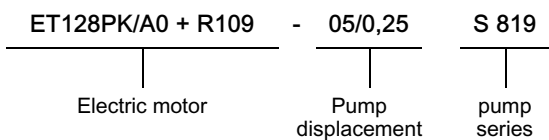


15 Order designation examples of Electro-Motor-Pumps

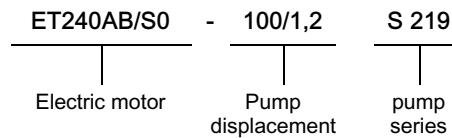
Group 05 E. motor without relay



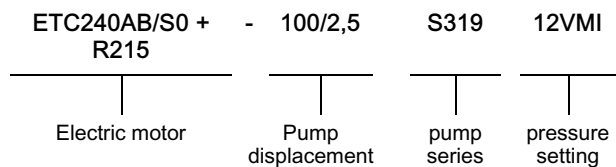
Group 05 E. motor with relay



Group 1 E. motor without relay



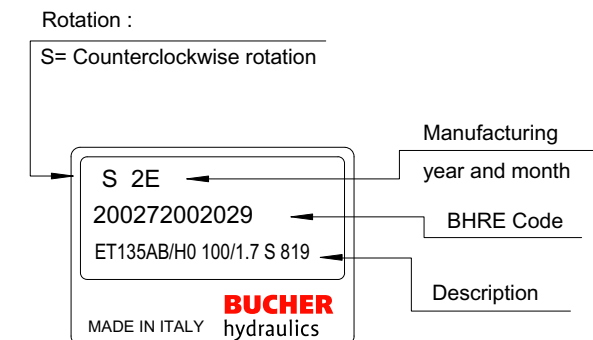
Group 1 E. motor with relay and VMI



Manufacturing Month	Manufacturing year			
	2012	2013	2014	2015
January	2A	3A	4A	5A
February	2B	3B	4B	5B
March	2C	3C	4C	5C
April	2D	3D	4D	5D
May	2E	3E	4E	5E
June	2F	3F	4F	5F
July	2G	3G	4G	5G
August	2H	3H	4H	5H
September	2I	3I	4I	5I
October	2J	3J	4J	5J
November	2K	3K	4K	5K
December	2L	3L	4L	5L

Product identification plate

Example



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www.bucherhydraulics.com

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Classification: 440.405.000