

- ▶ **Electric Multi-turn Actuator**
- Electric Part-turn Actuator
- Electric Linear Actuator
- Heavy-duty Pneumatic Actuator
- Pneumatic Actuator
- Pneumatic Actuator Accessories

# Electric Multi-turn Actuator **HM Series**



# Electric Multi-turn Actuator HM Series

## FEATURES

- A wide LCD window provides various useful information such as valve position and torque.
- Easy setup using a remote control
- Partial stroke function for valve diagnosis and water hammer prevention function are included as standard.
- Precise modulation control (500:1 based on 1 minute operating time) as an option
- Flameproof (Ex db IIB +H2 T4) as an option
- IP68 (upto 10 m, 72 hours) as an option
- Communication (PROFIBUS, MODBUS) options



## DESCRIPTION

Providing safe and reliable operation, the HM Series electric multi-turn actuator is designed for all multi-turn valve applications, such as globe valve, gate valve, and etc. In combination with a gearbox, It is also used for large size quarter-turn valves, such as ball and butterfly valves.

### Wide range of application

With reliable and stable operation, the HM Series is used in many industries:

- Oil & gas
- Power plant
- Chemical & petrochemical
- Water
- Marine
- General industries

### High corrosion protection

The housings of all HM Series actuator are made from high grade aluminum alloys which are robust and light weight. To provide high corrosion resistance, the housings are hard-andoized on the inside & outside and epoxy-polyurethane coating is further applied on the outside. For usage in severe corrosive environments, nano-coating could be further applied to the HM Series to enhance corrosion protection.



### Wide range of torque

The direct torque of HM Series ranges from 35 to 3,000 Nm. When combined with a worm gearbox, the maximum output torque is multiplied and reaches up to 500,000 Nm.

### User friendly interface

To set the HM Series actuator, there is no need to remove the cover (non-intrusive setting). All settings can be done by either using the local control switches or the remote control through the LCD window. The user interface supports English and Korean and displays:

- Current status display (open/ close/ stop)
- Current valve position & valve torque
- LED signal lamp  
(Red: open/ green: close/ yellow: fault)
- Temperature
- Fault message
- System back-up rechargeable battery level

### Smart and intelligent control

**Motor overheat protection:** the thermostat resistor inside the motor senses the temperature and stops the actuator in case of a motor overheat.

**Precise modulation control:** solid state design HM series actuators provide more accurate modulation control (500:1 based on 1 minute operating time).

**Reversal protection:** an auto time delay is added when the actuator is commanded to suddenly reverse its direction to prevent the valve from receiving a shock load.

**Water hammer protection:** adjustable pulsed operation is applied to any portion of the open/closing valve stroke to reduce the speed and to prevent the valve from receiving a hydraulic shock.

**Partial stroke function:** to ensure reliable valve operation, the HM-series partially opens/closes valve to the pre-set stroke and determines whether the valve is jammed or not.

**Auto phase discriminator** for 3-phase power

**Password setting** for security

**Communication:** PROFIBUS and MODBUS

### Certificates and approvals

IECEX, CE, ATEX, KCS, EAC, CCC, ABS, PROFIBUS





## DESIGN FEATURES

**1 Body & cover:** Body and cover of HM Series are made from high grade aluminium alloys. To have high corrosion resistance, they are hard anodized and epoxy-polyurethane coated. For usage in severe corrosive environments, nano-coating could be further applied to the HM Series to enhance corrosion protection. All components are precisely machined between the maximum and minimum permissible limits at HKC's machining center. The standard dimension of HM Series actuator is shown on page 9.

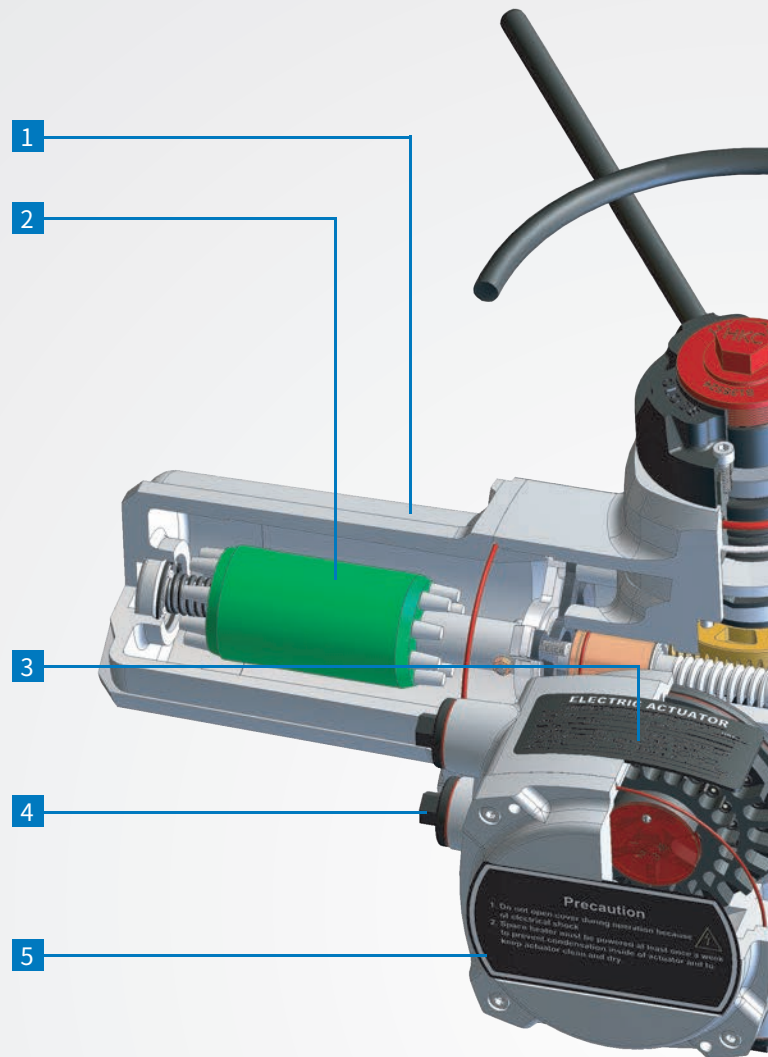
**2 Motor:** Available in 1-phase and 3-phase. The HM Series motors are customly built suitable for valve automation that have high torque, low current, and low inertia. Thermostat protection is ensured by a thermostat resistor inside the motor, which stops the motor in the event of an overheat.

**3 Nameplate:** All necessary information regarding the HM Series actuator can be found in the name plate such as model name, serial number, speed (in rpm), maximum torque, power, and etc. All HM Series actuators are assigned with a distinct serial number which is recorded in our system along with all necessary information for future reference.

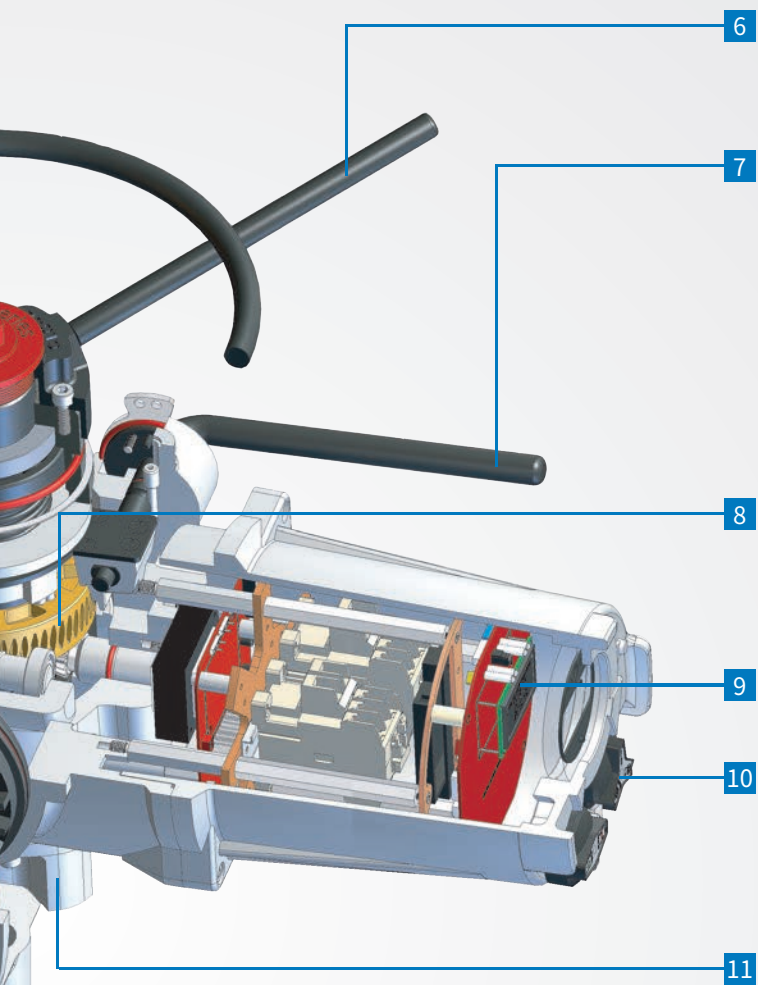
**4 Cable entries:** HM Series actuators have 5 cable entries:

- Standard: 4 x PF1", 1 x PF1½" (HM-004 to 060)  
4 x NPT1", 1 x NPT½" (HM-004 to 300)
- Flameproof: 4 x NPT1", 1 x NPT1½"

**5 Terminal compartment:** The double-sealed terminal compartment provides the actuator a complete protection from the environment even when the cover is removed for a wiring purpose, leaving the internal parts and wires intact.



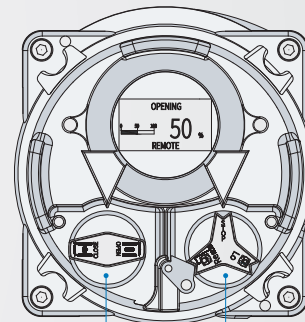
**6 Handwheel:** Manual operation (handwheel drive) can be activated when the **7 manual override lever** is locked into the manual operation (pushed down). Manual operation is independent of the motor drive thus it provides a safe operation; that is, the manual override lever can be pushed down and locked regardless of the motor status; whether the motor is running or not. Note that motor drive has preference over handwheel drive, which means the lever automatically returns when the motor starts running. Both handwheel and lever are designed to be easily separated from the body for easy maintenance and for convenient installation in narrow or small sites.



**8 Worm gear system:** The HM Series mechanical worm gear system provides a necessary self-locking feature which prevents displacement of valve position when an unwanted external force acts upon the valve.

**9 Display:** High resolution LCD screen displays various useful information including current status (open/ close/ stop), valve position, torque measurement, temperature, fault message, system back-up rechargeable battery level, and etc., along with duplicated LED signal lamp unit (red: open/ green: close/ yellow: fault). The display is protected by a thick 10 mm polycarbonate window.

All settings can be done by either using the local control switches or the remote control through the LCD window. The user interface supports English and Korean.



Function Selector Switch  
(Spring Return Type)

Operation Selector Switch

The standard handwheel for HM Series actuator is direct drive handwheel. For an effective and efficient manual operation, the size of the handwheel is selected in consideration of the actuator size.

Optional GearBox Handwheel (GBH) is also available on request which helps the user to turn the handwheel easier, but the number of turns increases by the gear ratio (please see Mechanical Data on page 9 for more details).

**10 Local control switches:** Both function selector switch (open/ close) and lockable operation selector switch (local/ stop/ remote) are magnetic switches that do not penetrate the control cover. This non-penetration design ensures isolation of the internal circuits and enhances the actuator protection from the environment such as water or dust ingress.

**11 Mounting base:** All thrust (ISO 5210) and non-thrust type (ISO 5211 or MSS SP102) bases can be easily separated for installation and maintenance. Meanwhile the actuator is still protected by the remaining bottom cover.

### Torque Table for 3-Phase Power

RPM		Torque (Nm)									
50 Hz	60 Hz	HM-004	HM-008	HM-011	HM-020	HM-040	HM-060	HM-100	HM-150	HM-200	HM-300
18	21	35	80	110	200	400	-	-	-	-	-
24	29	35	80	110	200	400	600	1000	1500	2000	3000
36	43	35	80	-	200	300	-	850	-	-	-
48	57	35	68	110	200	250	470	680	1000	1360	-
72	86	35	48	-	176	250	470	680	1000	1360	-
96	115	35	40	-	142	230	370	540	750	1000	-
Motor rating (kW)		0.75	0.75	0.75	1.2	1.2	1.9	2.6	3.7	5.5	5.5

### Torque Table for 1-Phase Power

RPM		Torque (Nm)		
50 Hz	60 Hz	HM-008	HM-020	HM-040
18	21	65	165	450
24	29	60	130	400
36	43	45	130	350
48	57	40	125	320
72	86	30	100	230
96	115	25	80	190
Motor rating (kW)		0.75	1.2	1.2

**Notes:**

- HM-040 actuator requires 220 V ac or more.

### Torque Table for 3-Phase Power Solid State Design Model

RPM		Torque (Nm)				
50 Hz	60 Hz	HM-004 S3	HM-008 S3	HM-011 S3	HM-020 S3	HM-040 S3
18	21	35	80	110	200	400
24	29	35	80	110	200	-
36	43	35	80	-	-	-
48	57	35	68	-	-	-
72	86	35	48	-	-	-
96	115	-	-	-	-	-
Motor rating (kW)		0.75	0.75	0.75	1.2	1.2

**Notes:**

- All 3 phase solid state design actuators require 380 V ac or more.

### Torque Table for 1-Phase Power Solid State Design Model

RPM		Torque (Nm)	
50 Hz	60 Hz	HM-008 S1	HM-020 S1
18	21	65	165
24	29	60	130
36	43	45	130
48	57	40	125
72	86	30	100
96	115	25	80
Motor rating (kW)		0.75	1.2

**Notes:**

- HM-008 S1 actuator requires 110/220 V ac
- HM-020 S1 actuator requires 220 V ac

# SPECIFICATION & MECHANICAL INFORMATION

## Standard Specification

Enclosure	Weatherproof enclosure IP67		
	High grade aluminium alloy, hard anodized & epoxy-polyurethane coated (HM-004 to HM-060)		
	Nodular cast iron & high grade aluminium alloy, hard anodized & epoxy-polyurethane coated (HM-100 to HM-300)		
Power supply	1-Phase: 110/220 V ac, 50/60 Hz, (HM-008, 020, 040) *HM-040 requires 220 V ac or more		
	3-Phase: 220/380/420/440/460/480-600 V ac, 50/60 Hz		
Voltage tolerance	±10%	Starting voltage drop (Max.)	-15%
Duty cycle (on-off)	1-phase power: S2 15 min, 3-phase power: S2 30 min (room temperature, average load of 50% of maximum torque)		
Duty cycle (modulating)	1-phase power: S4 25%, 3-phase power: S4 35%, 60-200 starts/hour (room temperature, average load of 50% of maximum torque)		
Torque	1-phase power: 24 to 450 Nm.		
	3-phase power: 35 to 3,000 Nm. When combined with a gearbox up to 500,000 Nm		
Lubrication	Standard: grease moly (EP type)		Monitoring switches
	Option: Tribolube-18 (for low temperature)		
Travel angle	0 to 10,000,000 turns		Cable entries
Signal lamp unit	Red: open, green: close, yellow: fault		
Self locking	By worm gear		Ambient temperature
Motor	Induction motor (reversible motor)		
Design life	Torque & thrust test: 50,000 cycles		Indicator
Manual operation	Declutchable manual override		
Mounting base	Multi-turn: ISO 5210, Part-turn: ISO 5211 MSS SP-102		Digital display position indicator
Local/remote control	Local control: two rotary selector switches (function switch & operation switch), remote control: setting tool (LCD window)		
Color	Standard: Grey (Munsell no. N6.5) or matte grey (Munsell no. M2.5)		

## Optional Specification

EXD	Flameproof enclosure IECEx & KCs: Ex d IIB +H2 T4, ATEX II 2 G EX d IIB T4 Gb (-20 to +60 °C)		
GBH	Gearbox handwheel	WTA	Watertight enclosure (IP68 10 m / 72 hours)
PCU	Proportional Control Unit (input/output: 0 – 10 V dc or 4 – 20 mA dc)	AMS	Additional Monitoring Switches (4 x SPST, 250 V ac 16 A rating)
ICM	Independent control module: independant remote control station to operate actuator from a long distance	ASC	Actuator body and control unit separated
FPA1	Fire Proofing Actuator (1050 ± 5 °C / 50 min) / (250 ± 5 °C / 150 min)	CPT	Currentt Position Transmitter (output: 4 – 20 mA dc)
MODBUS	Modbus modules	PROFIBUS	Registered profibus DP interface modules

## Mechanical Data

Model	HM-004	HM-008	HM-011	HM-020	HM-040	HM-060	HM-100	HM-150	HM-200	HM-300
Flange size (ISO 5211)	F10	F10	F10	F14	F14	F16	F25	F25	F30	F30
Weight (kg)	40	40	40	65	65	75	190	190	200	200
Thrust rating (Nm)	44	44	44	100	100	150	220	220	334	445
Hand wheel ratio	Direct	Direct	Direct	Direct	Direct	Direct	Direct	18 : 1	18 : 1	18 : 1
MGO ratio	15 : 1	15 : 1	15 : 1	15 : 1	15 : 1	23 : 1	54 : 1	54 : 1	54 : 1	54 : 1

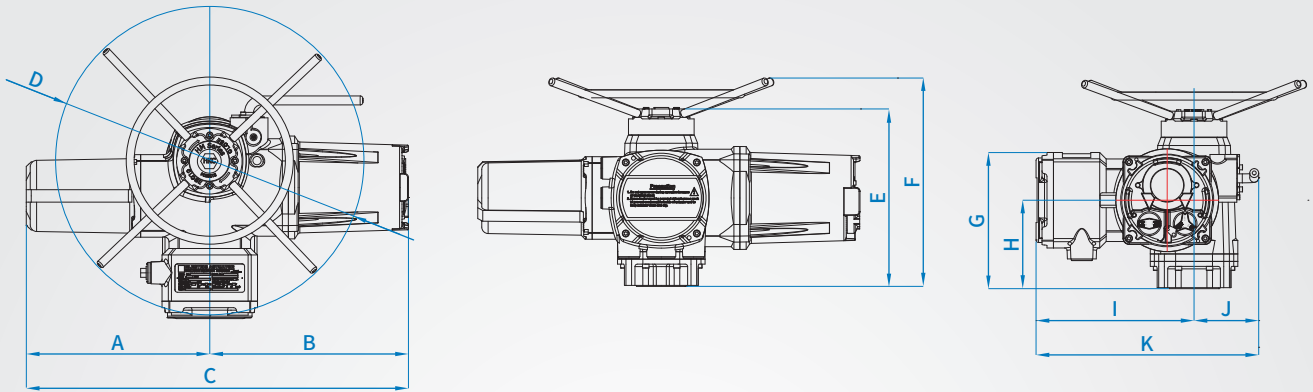
## Mounting Base - Maximum Stem Diameter

Model		HM-004	HM-008	HM-011	HM-020	HM-040	HM-060	HM-100	HM-150	HM-200	HM-300
Thrust	Rising	32	32	32	38	38	54	64	64	64	64
	Non-rising	26	26	26	32	32	45	51	57	57	73
Non-Thrust	Large type	42	42	42	60	60	80	100	100	120	120
	ISO type	20	20	20	30	30	40	50	50	50	N/A
	Blank type *	20	20	20	30	30	44	50	60	60	N/A

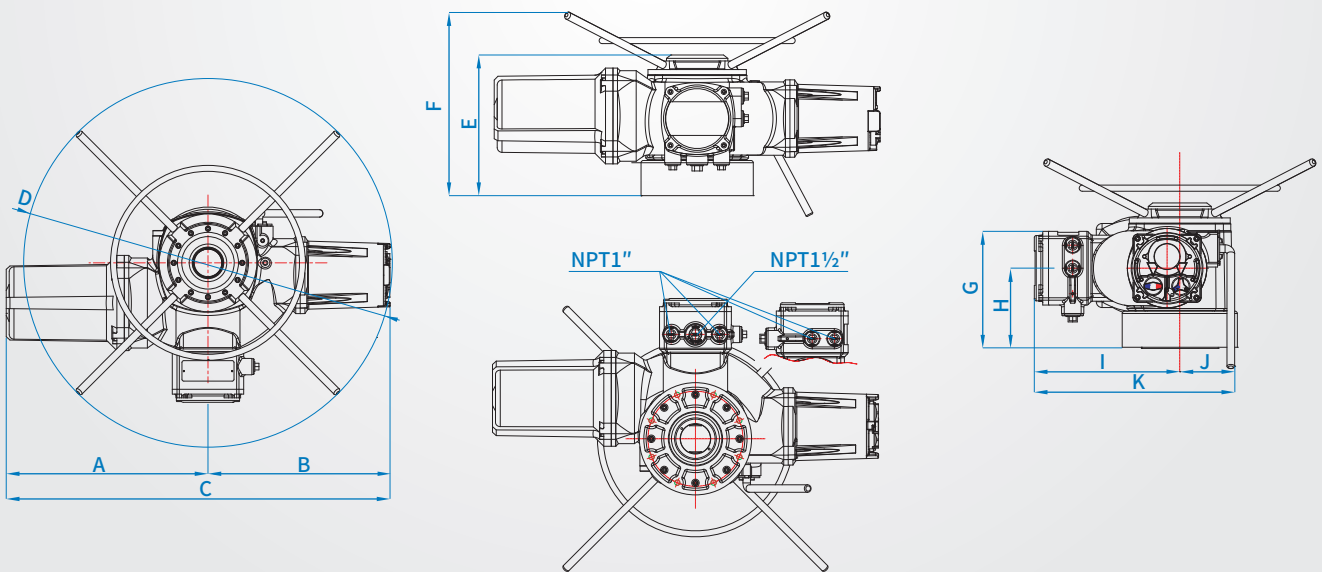
\*Standard

## DIMENSIONAL DRAWING (Standard)

HM-004, HM-008, HM-010, HM-020, HM-040, HM-060



HM-100, HM-150, HM-200, HM-300



### Dimension

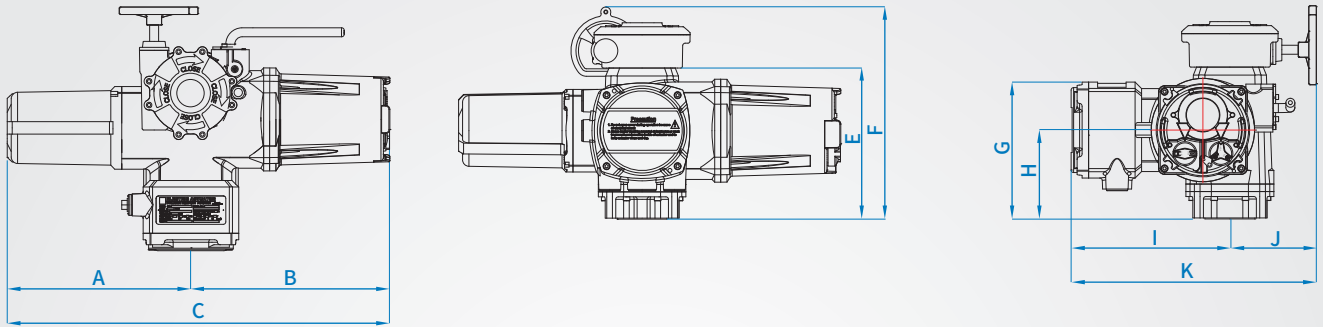
unit (mm)

Model	A	B	C	D	E	F	G	H	I	J	K
HM-004	291	382	673	490	265	316	227	131	277	130	407
HM-008	291	382	673	490	265	316	227	131	277	130	407
HM-011	291	382	673	490	265	316	227	131	277	130	407
HM-020	369	400	769	620	357	420	274	178	318	130	448
HM-040	369	400	769	620	357	420	274	178	318	130	448
HM-060	384	407	791	835	393	481	294	198	320	132	452
HM-100	453	490	942	995	379	494	305	209	379	143	522
HM-150	453	490	942	995	379	494	305	209	379	143	522
HM-200	508	490	997	995	419	611	305	209	379	143	522
HM-300	508	490	997	995	419	611	305	209	379	143	522

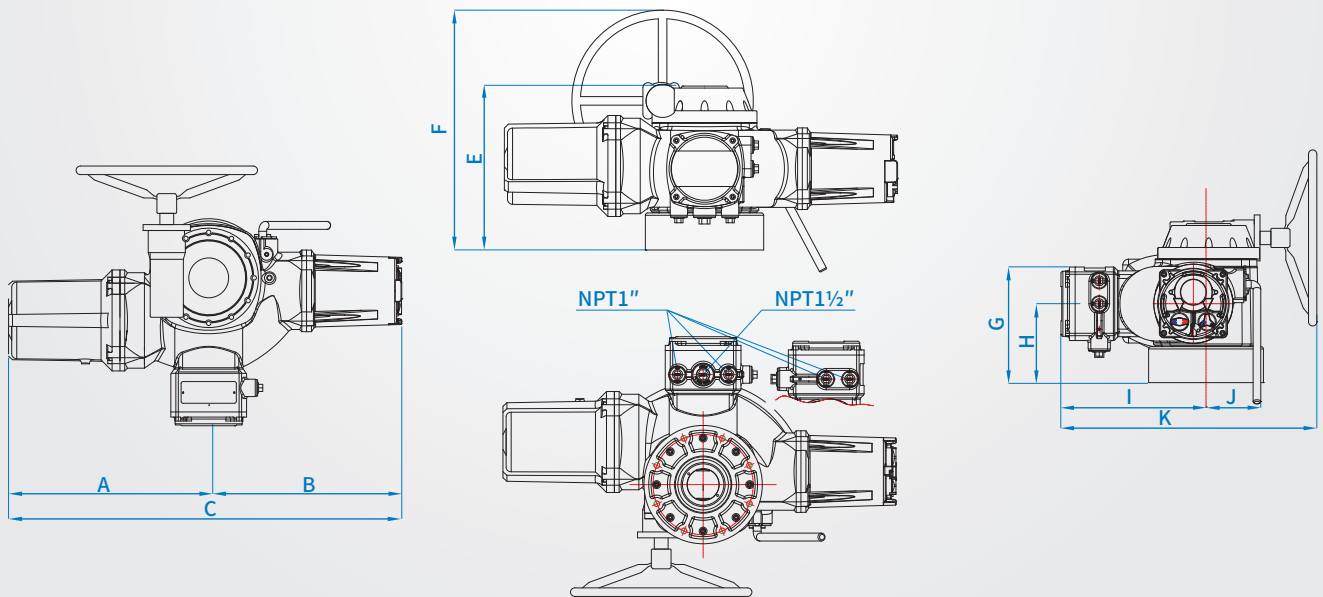


## DIMENSIONAL DRAWING (Gearbox Handwheel)

HM-004, HM-008, HM-010, HM-020, HM-040, HM-060



HM-100, HM-150, HM-200, HM-300

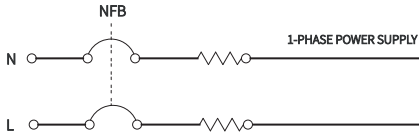


### Dimension

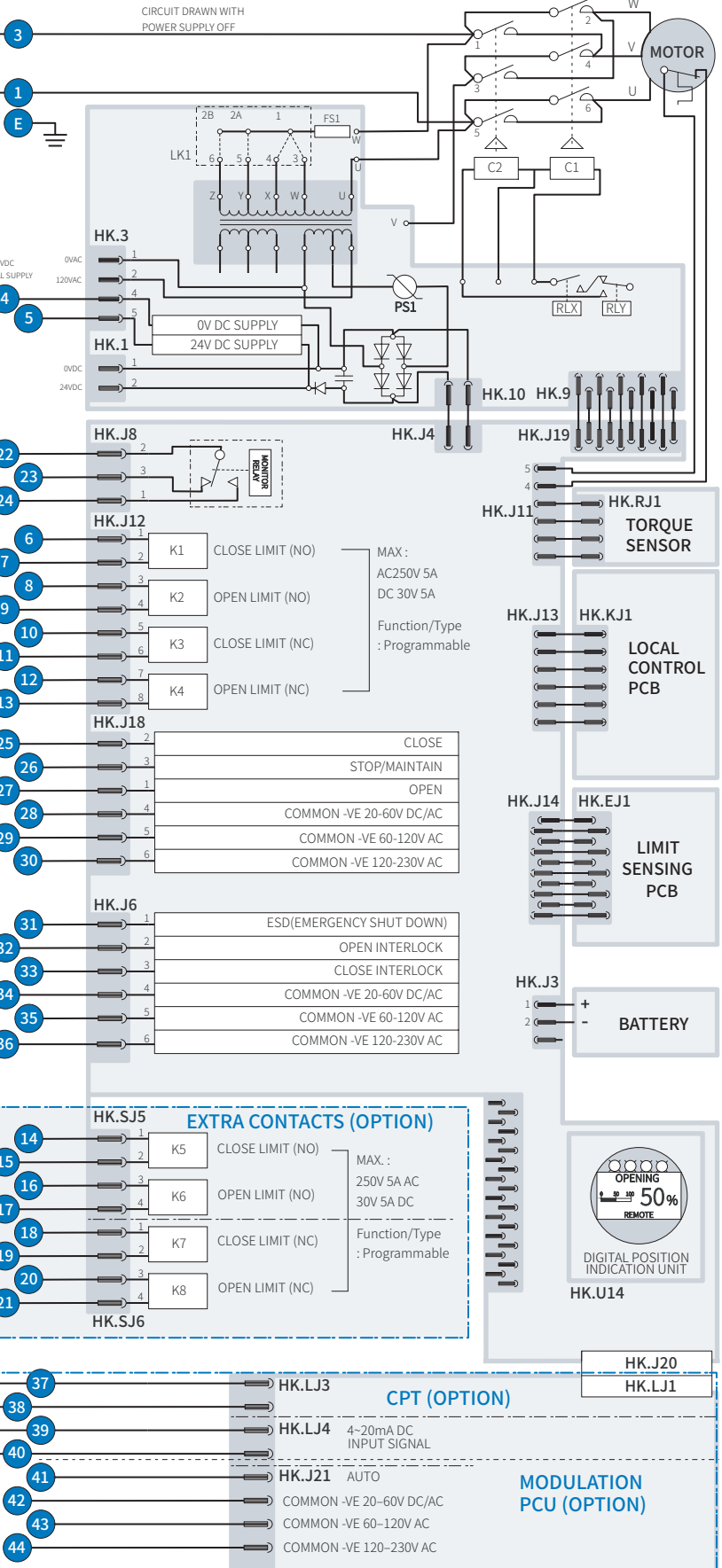
Model	A	B	C	E	F	G	H	I	J	K	unit (mm)
HM-004	291	382	673	237	357	316	227	131	157	434	
HM-008	291	382	673	237	357	316	227	131	157	434	
HM-011	291	382	673	237	357	316	227	131	157	434	
HM-020	369	400	769	304	427	420	274	178	173	491	
HM-040	369	400	769	304	427	420	274	178	173	491	
HM-060	384	407	791	324	467	481	294	198	174	494	
HM-100	453	490	942	416	608	493.5	305	209	143	669	
HM-150	453	490	942	416	608	493.5	305	209	143	669	
HM-200	508	490	997	416	608	611	305	209	143	669	
HM-300	508	490	997	416	608	611	305	209	143	669	

# WIRING DIAGRAM (1-Phase Power)

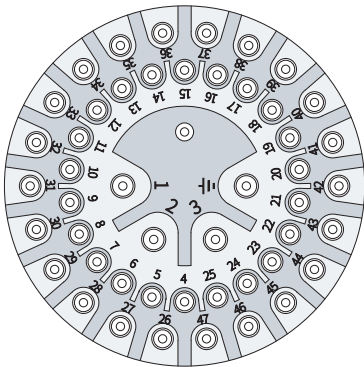
## CUSTOMER SUPPLY FIELD WIRING



## CONTROLLER & ACTUATOR

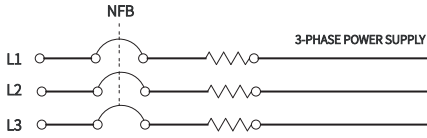


## Terminal Block - Numbering

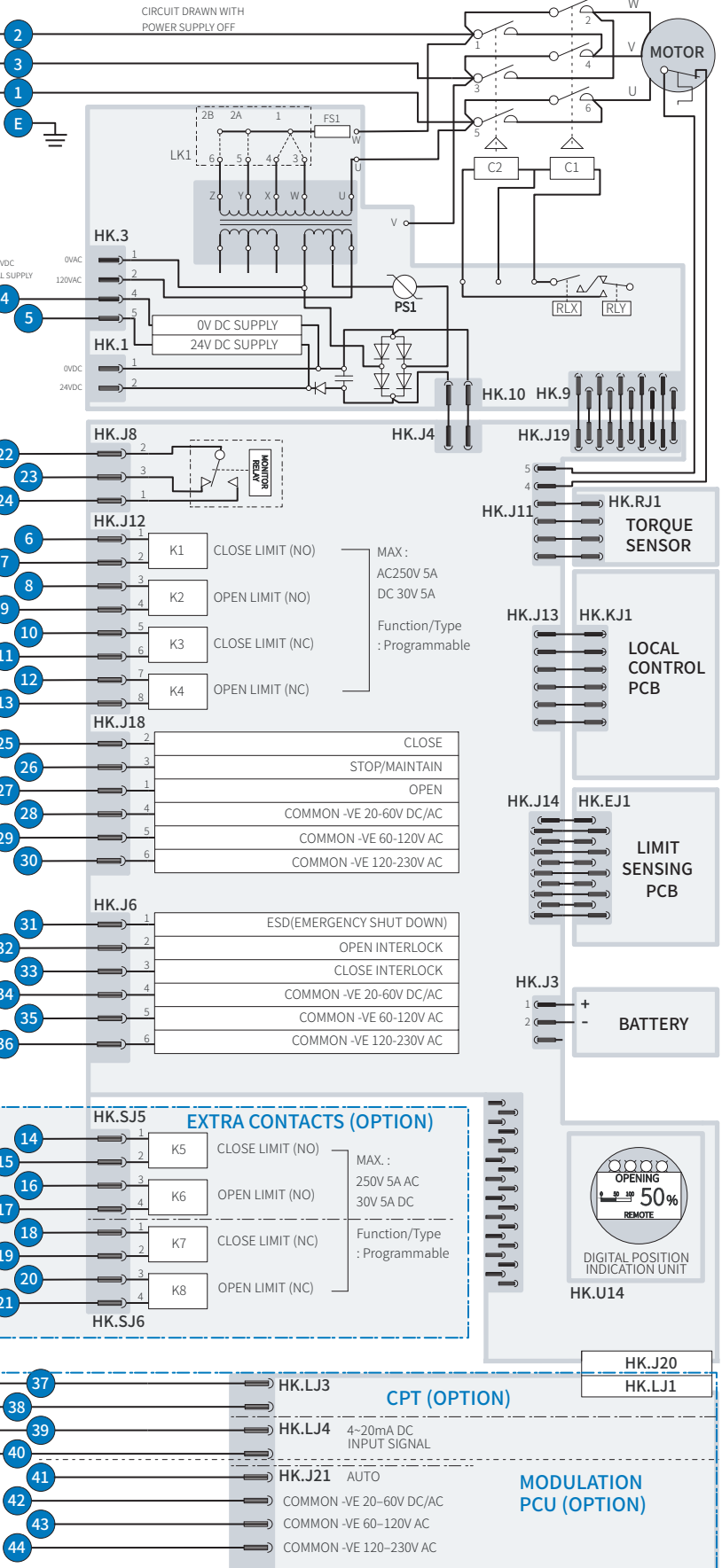


# WIRING DIAGRAM (3-Phase Power)

## CUSTOMER SUPPLY FIELD WIRING



## CONTROLLER & ACTUATOR



Valve automation leader **HKC**



**HKC Co., Ltd.**

**Add.** 26, Emtibeui 28-ro, Siheung-si, Gyeonggi-do, Republic of Korea (15119)

**Tel.** +82-31-488-8266

**Fax.** +82-31-488-8269 / 8696

**E-mail.** [hkcon@hkcon.co.kr](mailto:hkcon@hkcon.co.kr)

**Web.** [www.hkcon.co.kr](http://www.hkcon.co.kr)

