Helical Flow

Helical Flow Type of Screw Revolution

Instruction Manual

for

HF-PC Series

(A & G types and I,V,W,N & T types incld.)

⚠ Caution

Before use, please read this Instruction Manual with caution for your safety operation, and then use it properly. Should you have any further difficulties that are not covered in this Manual, please contact us and we could give you appropriate advices you would require. Please always keep this Instruction Manual at hand for your quick reference when necessary.

TOFLO CORPORATION

156-R07

Table of Contents

1. Safety precaution

⚠ Warning

As the **Instruction manual** includes very important contents in order to use the products properly and in safety, please read this manual thoroughly, and comply with them. Please always keep this **Instruction Manual** at hand for your quick reference when necessary. Should it be lost, then please contact us at nearest sales office.

⚠ Caution

《 Design precaution 》

- Do not use the Helical Flow in excess of the rating of the power supply voltage. If not, it may cause damage to the sensor.
- Should the Helical Flow be continued to use in excess of the maximum values of the maximum operating pressure and fluid temperature, it may cause damage to the Helical Flow, and can cause it to read inaccurately.
- Flow measurement should be always carried out in a condition where the inside of the Helical Flow is filled fully with fluid. If not, the correct flow measurement cannot be carried out.
- If used any fluid other than the designated fluid, it can cause it to read inaccurately and/or may cause damage to the Helical Flow in consequence of the fluid temperature, viscosity and pressure, etc..
- HF-PC Series including all the types of A, G, I V, W, N and T (hereinafter referred to as "HF-PC Series", unless otherwise specified) should be used for the industrial instrument only, but may not be used for medical and food product applications.
  Provided it may be sometimes possible to correspond in consultation with you about your specifications.

⚠ Caution

《 Precaution for use 》

- If an excessive load is continuously exerted on the Helical Flow when piping, or during operation, it may cause damage.
- Be sure to tighten the hexagonal part of the fitting with back-up wrench holding the meter body.
- As the main body is made of polysulfone, it reacts to the metal piping sealant, such as methacrylic acid ester system, causes crack, and results in damage. To prevent it from crack and damage, it is recommended to use the epoxy type adhesive as piping sealing agent.
  For more detailed information about sealing agent, consult us at our sales contact with your specification.
- Do not mix foreign materials, etc. (Dirt, air bubbles) into the fluid. If done, it may cause damage to the Helical Flow and error in flow measurement.
- If repeating an abrupt changes of ambient temperature, fluid temperature and operating pressure, it may cause damage to the Helical Flow.
- In no event should the Helical Flow be used in the atmosphere of corrosive and explosive gases.
- Water proof and moisture proof structure are not provided for this Helical Flow. Do not use it in locations where the condensation of humidity will occur and where water will be sprayed.
- Install the Helical Flow in locations where ambient temperature is between 0℃ and 50℃, and where is not subjected to direct sunlight.

- Use the Helical Flow in a location where there will be no interfererance of the electromagnetic induction around there.
- Use the Helical Flow in a location where it is less subjected to the mechanical vibration.

⚠ Caution

《 Wiring 》

- Make sure that wiring should be done after turning off power.
- Make sure power supply voltage to ensure that power supply input has not been exceeded the ratings.
- If using the device such as switching regulator and inverter motor, etc. which will become a noise source in the vicinity of the Helical Flow, take so measures for the noises as to ground the frame ground terminal (F.G) of the device and the like.
- When wiring to the flow indicator or sequential controller, be sure to wire after confirmation of the color of the lead wires.
- Avoid continuously turning on/off the power.
- Do not apply any additional pressure and tensile stress to the wiring to the terminal block. It may cause disconnection.
- The connected wires coming from the Helical Flow should not be bundled, wired in parallel and made up metal raceway together with the heavy current cables such as power cable, power line, high voltage cable and the like. If bundled together, the noises may transfer to the signal lines, and may result in malfunction.

⚠ Caution

《 Flow indication 》

- When purchased both the Helical Flow and the flow indicator at the same time, the data necessary to indicate the flowrates are all configured at the factory when shipping. Only you have to do is to make up pipe and run the water, so that the accurate flowrates are displayed on the indicator, provided that the data input of the comparative output directly with no reference to such flow indication has been configured at the initial values, unless otherwise specified.
- In case where the water is initially run to the pipe (When setting up the systems), air bubbles have been entered into the inside the Helical Flow, and air entrapping may occur accordingly. Air bubbles inside the meter may cause it to read inaccurately and/or malfunction.
  When setting up systems, eliminate air bubbles by means of running the water of around maximum amount of flowrates and fill the inside of the Helical Flow fully with water.

⚠ Caution

《 Other applications 》

- It shall not be covered by warranty, if the product has been disassembled and reassembled. The product has a serial number of its own. It also shall not be covered by warranty, should any change of the parts be made on the product.

- Be careful to handle the Helical Flow, as it is a precision instrument. It may cause leak and damage, if given the shock by falling or fallen anything on it.
- HF-PC Series has a function only to produce pulse signal continuously. Please understand that any supply operation or any automatic flow control cannot be performed in a single unit of this product as such.

⚠ Caution

《 Requesting and notifying 》

- Specifications and dimensions are subject to change due to improvements without prior notice.
- Warranty period of the product shall be one year from the date of purchase. (For one year counting from the next month of the month shipped from factory).
- During the warranty period, if the fault for which we are liable has been occurred, we will repair the faulty part of the product or replace it with new one only.
- HF-PC Series itself do not have any control function to protect from disaster and accident. We would like to request you to take into consideration any safety measures on your side for the control devices entirely. Please understand that we are not liable for the compensation to the damage caused by disaster and accident where have by chance occurred in the related devices using these products.

2. Greeting

We highly appreciate your purchasing the Helical Flow of the screw revolution type " **HF-PC Series including A and G types and I, V, W, N and T types** ".

We would like to request you to read through the Instruction Manual with caution in order fully to display the performance and to use it safely for many years to come.

《 General description 》

The Helical flow of screw revolution type **"HF-PC Series"** is a pulse counting flowmeter by Hall element which has been constructed most simple and compact and has been offering at low cost.

The Helical Flow allows the Hall IC to count the revolution of screw (One revolution ＝ two pulse), and to produce pulse signal by using the magnets sealed in the interior of the screw.

The flow indicator receives the pulse signal from the Helical Flow, computes and displays the instantaneous and integrated flowrates per one minute according to the sampling time and pulse counting.

《 Accessories 》

Check to ensure that the following has been all present.

- Helical Flow body: (HF-PC Series)
- Instruction Manual

＜Options＞

- Flow indicator
- Connecting cord (Only in case that the flow indicators are EM0100 DT/DR and EM1000ET)

⚠ Caution

3. Product specifications

HF-PC(A/G タイプ)

Flow accuracy	FS±3%	
Max. operating pressure	0.35Mpa(G)	
Operating fluid temperature	**A type**	**G type**
	Max 80℃	Max 50℃
Ambient temperature	0 - 55℃	0 - 50℃
Power supply	5 - 24VDC±10% Approx max. 10mA	24VDC±10% Approx max. 10mA
Pulse output	NPN open collector DC26.4V 15mA, 0 – approx 120Hz	NPN open collector DC35V Max 10mA
Electrical consumption	Below 100mA	

HF-PC(I/V/W/N/T タイプ)

Flow accuracy	FS±3%				
Max operating pressure	0.35Mpa(G)				
Operating fluid temperature	**I type**	**V type**	**W type**	**N type**	**T type**
	Max 80℃				
Ambient temperature	0 - 55℃				
Supply voltage	DC24V ±10% Approx 65mA	24VDC±10%, Approx 40mA			
Analog output	4 – 20mA Load resistance: Below 300kΩ	0 – 5 VDC Load resistance: Below 5 kΩ	0 – 10 VDC Load resistance: Below 5 kΩ	1 – 5 VDC Load resistance: Below 5 kΩ	1 – 10 VDC Load resistance: Below 5 kΩ
Comparative output relay	One transfer contact（1 c contact ） Contact capacity:30VDC・100mA				
Comparative output transistor	NPN open collector Sink current:Below 100mA Vol=1.0V Max impressed voltage :Below 35VDC				

⚠ Caution

4. Combination of the Helical Flow with flow indicator

- If purchased both Helical Flow and the indicator at the same time, check the serial number (Mfg. No.) to ensure that the serial number of the Helical Flow agrees with that of indicator.
  If having used the Helical Flow which is different serial number from that of indicator, it might cause errors in the flowrate and fow indication.
- The appropriate data have been configured to indicator at factory when shipping from factory.
- In case where purchased the Helical flow only, check the serial number to ensure that it is securely entered.

⚠ Caution

《 The Helical Flow and its Hall IC sensor 》

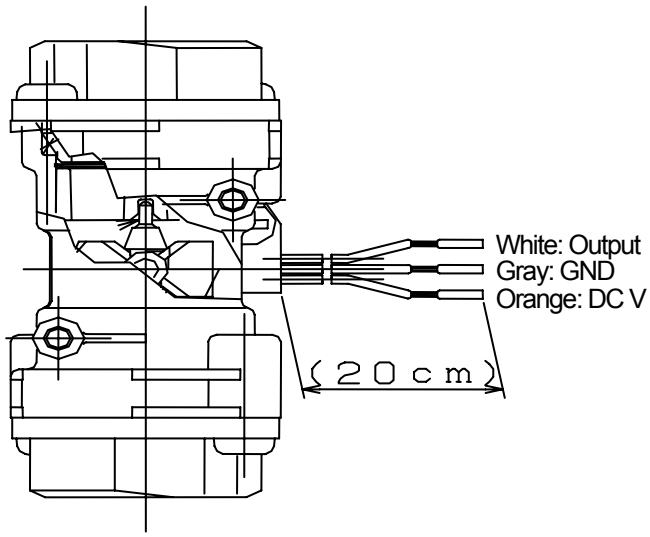
The Helical Flow and Hall IC sensor should be used in the same manner as they are shipped.
If disassembled, and combined with any device other than the one as shipped, you cannot measure the flowrate correctly.

⚠ Caution

《 Explanation for connecting terminals to the Helical Flow 》

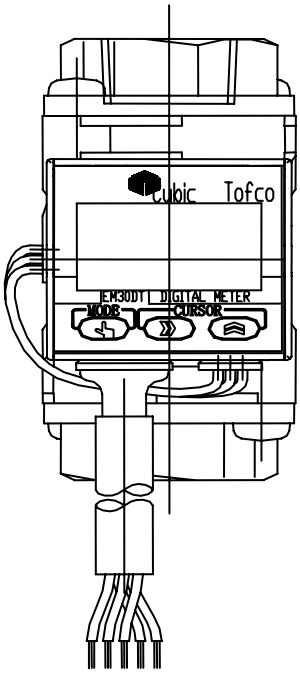
- Wiring should be done with reference to the drawings as follows.

HF-PCA type



Cord colors	Functional contents
Orange	+ D C V
Gray	G N D
White	Output (Voltage pulse)

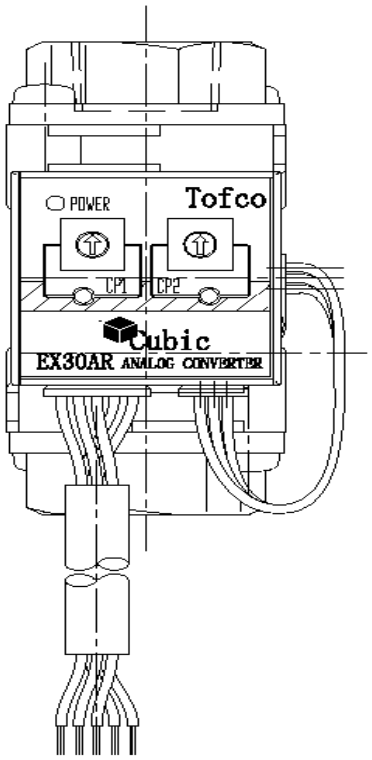
HF-PCG type



Pin No.	Names of signals	Wire colors
1	CP 1	Yellow
2	CP 2	Green
3	COM	White
4	GND	Black
5	24V	Red

* Regarding how to use the indicator (Type: EM30DT), see the Instruction Manual for EM30DT attached separately.

HF-PC(I/V/W/N/T types)



Pin No.	Names of signals	Wire colors
4	Analog output GND	Blue
5	Analog output	Brown
6	CP 1 (N.C.)	Yellow
7	CP 1 (N.O.)	Orange
8	CP 2 (N.O.)	Green
9	CP 2 (N. C.)	Purple
10	Common to CP1 and CP 2	White
11	0V	Black
12	24VDC	Red

* Regarding how to use the analog output unit (Type: EX30AR), see the Instruction Manual for EX30AR attached separately.

⚠ Caution

《 Connection of the Helical Flow to the flow indicator (EM0100DT/DR and EM1000ET) 》

※ When using any flow indicator other than as described above, see the Instruction Manual attached separately.

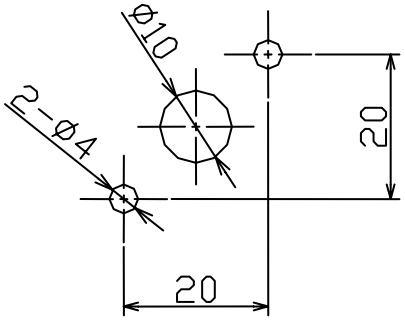
Cord colors		Functional contents
EM0100(DT, DR)	EM1000ET	
Gray	Black(Thin)	Pulse input terminal
Blue	Blue	Common terminals to input and sensor power supply
Brown	Brown	Sensor power supply (12VDC)

● Other connections

For the information about how to connect the driven power supply and the output (Analog output, etc.) coming from the EM Series flow indicator, wire and connect with reference to the Instruction Manual attached to the indicator.

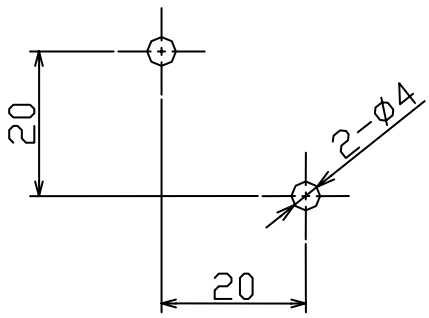
5. For panel cut-out

Panel cut-out



For front panel cut-out

(The Φ10 hole is a view port visually to see the screw revolution.)



For rear panel cut-out

For HF-PCG/PC(I/V/W/N/T) type only

※ The length of sheet-metal screw (Nominal diameter : 3-2 class with groove) should be selected considering the panel thickness. (Depth of prepared hole is 7mm deep.)
HF-PC Series Helical Flow should be installed in no more than 35cN of torque for securing of panel. (If not, it may cause damage to the installing part, and may lose the screw cramp function.)

⚠ Caution

6. Maintenance

Although the Helical Flow HF-PC Series has been constructed much harder to clog with dust than the conventional rotary flowmeter, it is recommended to maintain (Cleaning) once a year or half year for your safety operation.

7. Where to contact

TOFLO CORPORATION

Headquarters: 3-17 Minamidaira, 4-chome Hino City, Tokyo 191-0041
Tel: 81-42-593-8811 / Fax: 81-42-593-8812
Tokyo Sales Office: 3-17 Minamidaira, 4-chome Hino City, Tokyo 191-0041
Tel:81-42-592-6111 / Fax: 81-42-592-6112
Osaka Sales Office: Suite 915, East Exit Station Bldg.
20-14 Higashinakajima, 1-chome Higashiyodogawa ward, Osaka City Osaka-Fu 533-0033
Tel:81-6-4809-0411 / Fax:81-6-4809-0412
Fukuoka Sales Office: 2F K-2 bldg.
8-5 Hakataekiminami, 5-chome Hakata ward, Fukuoka City Fukuoka pref. 812-0016
Tel:81-92-482-2101 / Fax:81-92-482-2102
Sendai Sales Office: Suite 102, Izumi Kankoh bldg.
8-6 Shohgen, 1-chome Izumi ward, Sendai City Miyagi pref. 981-3132
Tel:81-22-218-2451 / Fax:81-22-218-2452