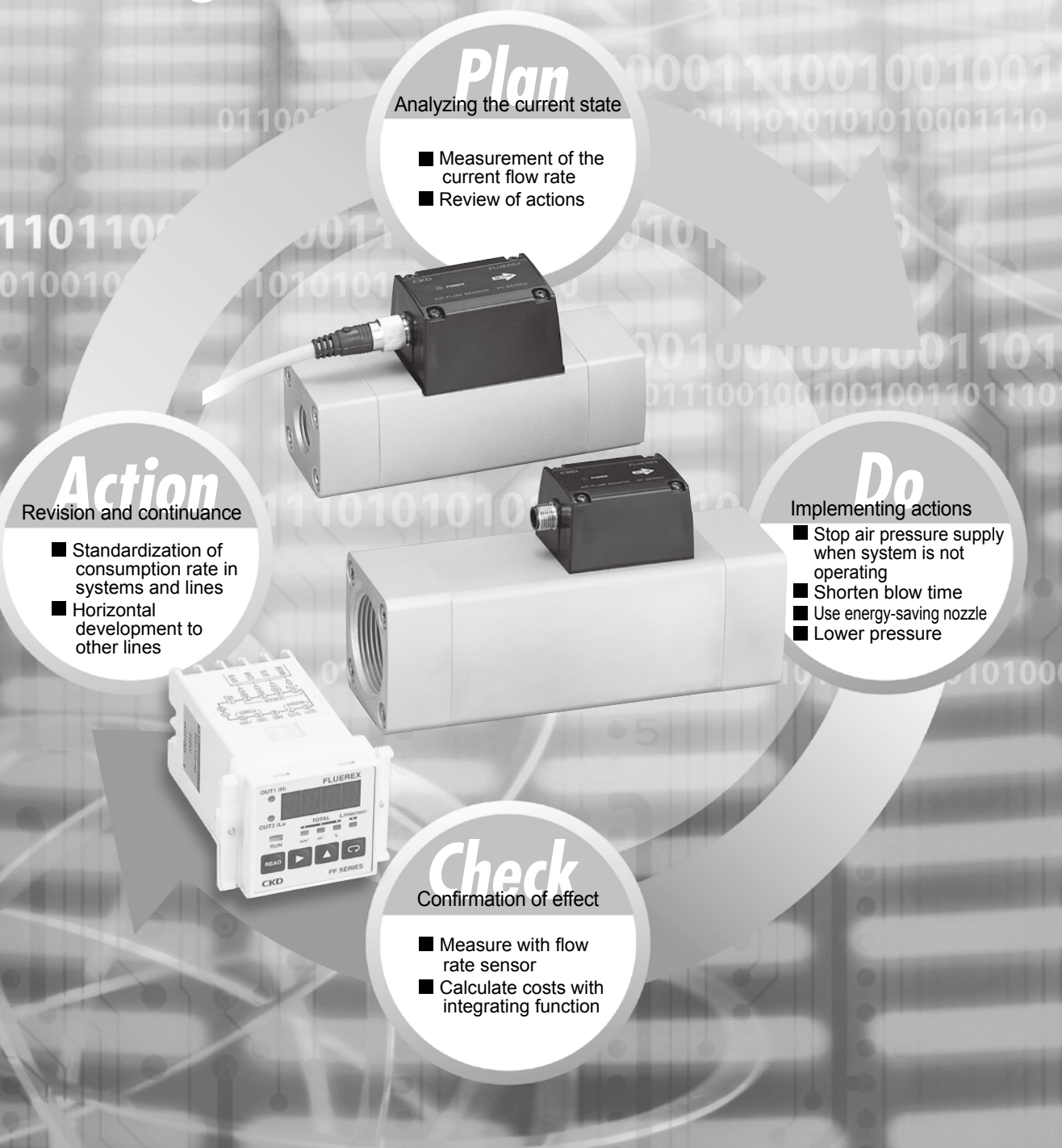


Contributing to the global environment with energy saving control.



Flow rate sensor for compressed air

FLUEREX PFD Series

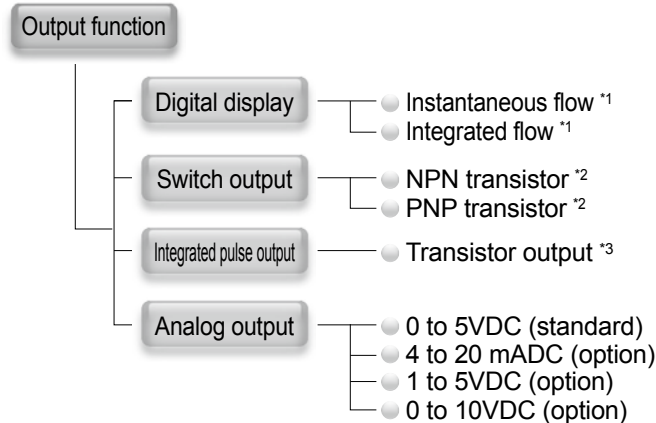
CKD

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FImResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneur
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

PFD Series FLUEREX flow rate sensor for compressed air assists in analyzing current energy consumption and confirming the effect.



Ample output variations



*1. Switch between the instantaneous flow and integrated flow with a single touch.

*2. Select NPN or PNP for the switch output. Two output points are provided. (PFK Series has 1 point)

*3. Change one of the switch outputs to an integrated pulse output with easy operation.

New

New

RoHS Directive compliant

All substances, such as lead and hexavalent chrome, which could adversely affect the global environment, have been completely eliminated from the materials used in this controller.

RoHS

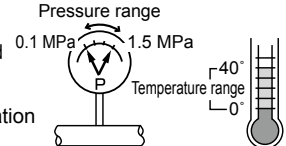
Optimum for ISO 14001 acquisition

The lineup includes a large flow which supports energy saving control in factory units. This device is essential for acquiring ISO14001, the International Standardization Standard for environment management systems.

Directly read digital displays with no need for calibration

Since bothersome pressure correction and temperature compensation are not required, the digital display value can be read and used.

- Pressure correction not required
Method of detecting weight flow adopted
- Temperature correction not required
Automatic temperature compensation function built in



High precision with general precision of $\pm 4\%$ F.S.

General precision of $\pm 4\%$ F.S. is realized in a temperature range of 10 to 30°C and pressure range of 0.2 to 0.7 MPa even without calibration.

$$\text{Total precision} = \pm \sqrt{(\text{linearity})^2 + (\text{temperature characteristics})^2 + (\text{pressure characteristics})^2}$$

(Note) The general precision is the reference value including all errors including the errors from temperature or pressure variation and the linearity, etc.

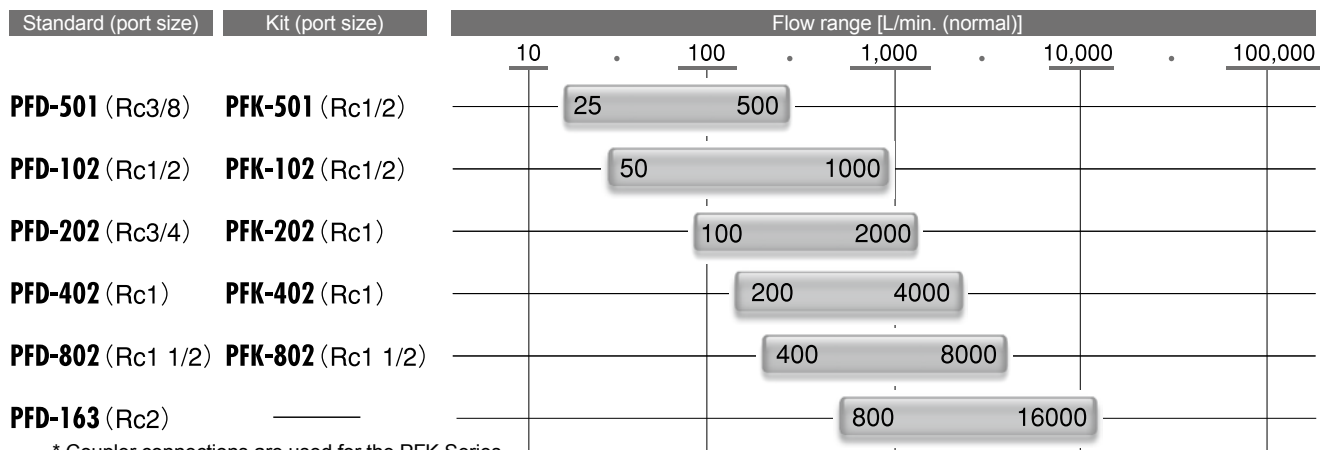
Convenient portable kit available

Five types of tester kits consisting of a sensor section, monitor section and piping, etc., in a trunk case are available.

- Piping and wiring can be changed with a single touch.



Covering a wide range of flow rates with 11 types



* Coupler connections are used for the PFK Series.

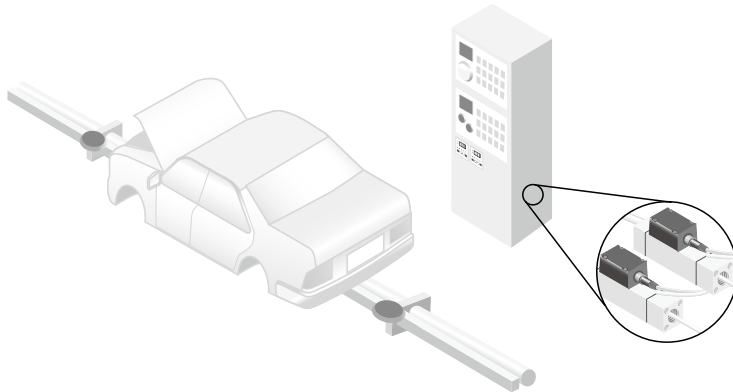
F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PresCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

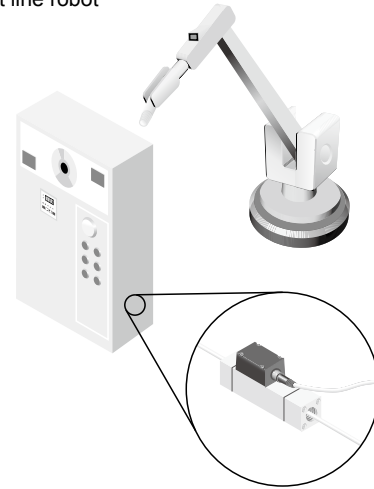
Applications of flow sensor for compressed air

For flow rate management of production line of an auto plant

■ Auto line control

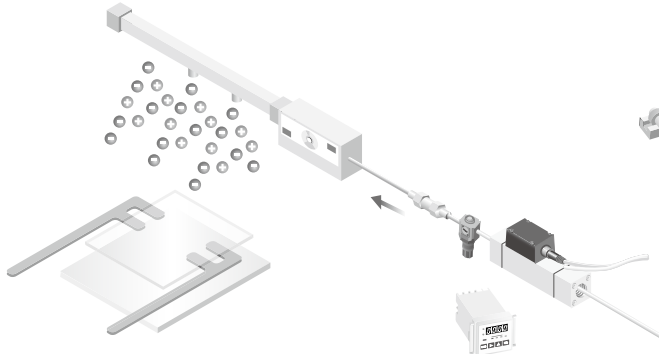


■ Paint line robot

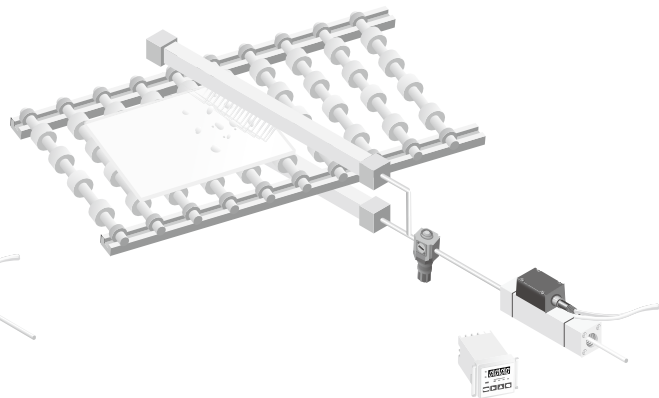


For flow rate management of FPD manufacturing equipment

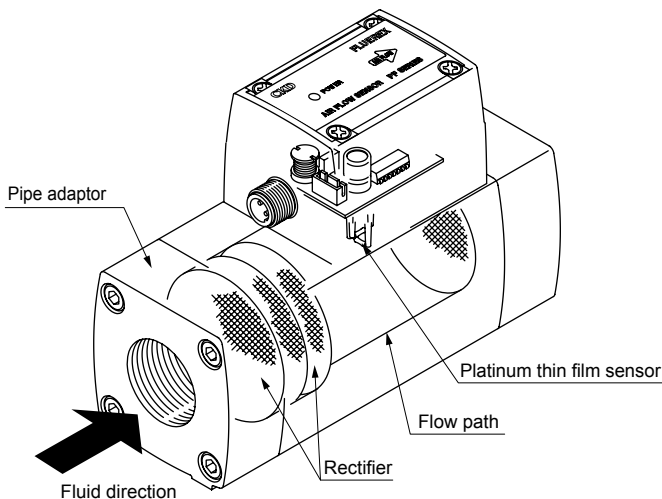
■ Ionizer



■ Air knife



Functions



The sensor of FLUEREX consists of a rectifier that converts the compressed air to a uniform flow and a platinum thin film resistor that detects the flow rate. The rectifier works to make the flow uniform when a bent pipe such as an elbow is installed immediately before the sensor. Through the use of multiple rectification plates, the pressure loss is suppressed and an adequate rectification effect is realized. When the compressed air does not flow, the platinum thin film sensor that detects the flow rate is heated from the fluid temperature to a certain constant temperature. When the compressed air flows, the amount of heat proportional to the weight of air is detracted and the current that intends to maintain the constant temperature flows in the circuit inside the platinum thin film sensor that detects the flow rate. By receiving this current as a flow rate signal, the display section displays a practical atmospheric pressure, instantaneous flow rate or integrating flow of the air converted to 0°C. In addition, by the platinum thin film sensor that detects the fluid temperature, the temperature of the compressed air is measured and the temperature correction is performed.

Tester kit

PFK Series

Equipment for measuring the air flow rate is provided in a kit, and this enables immediate measurements on site.

- Flow rate range: 25 to 500, 50 to 1000, 100 to 2000, 200 to 4000, 400 to 8000 L/min (normal)

RoHS



Specifications

Item		PFK-501-15NO	PFK-102-15NO	PFK-202-25NO	PFK-402-25NO	PFK-802-40NO
Specs	Flow rate range L/min(normal)	25 to 500	50 to 1000	100 to 2000	200 to 4000	400 to 8000
	Port size	Rc1/2		Rc1		Rc1 1/2
Working conditions	Applicable fluid	Compressed clean air/nitrogen gas				
	Air quality	JIS B8392-1: 2012 (ISO 8573-1: 2010) [1:1:1 - 1:6:1] (*1)				
	Max. working pressure MPa	1.0 (≈150 psi, 10 bar)				
	Min. working pressure MPa	0.1 (≈15 psi, 1 bar)				
	Proof pressure MPa	1.5 (≈220 psi, 15 bar)				
	Ambient temperature °C	0 (32°F) to 50 (122°F)				
	Ambient humidity	85% R.H. or less (no condensation)				
	Fluid temperature °C	0 (32°F) to 40 (104°F)				
	Accuracy	Linearity	±3.0% F.S. (0.5 MPa (≈73 psi, 5 bar), at 20°C (68°F))			
Pressure characteristics		±2.0% F.S. (0.5 MPa (≈73 psi, 5 bar) reference, at 0.2 (≈29 psi, 2 bar) to 0.7 MPa (≈100 psi, 7 bar))				
Temperature characteristics		±2.0% F.S. (20°C (68°F) reference, at 10 (50°F) to 30°C (86°F))				
Pressure loss MPa		0.015 (≈2.2 psi, 0.15 bar) or less (max. flow rate, at 0.5 MPa (≈73 psi, 5 bar))				
Response time sec		2.5 or less				
Output	Display	Instant/integrating flow 4-digit LED display				
	Resolution L/min(normal)	1	5	5	10	20
	Min. displayed flow rate L/min(normal)	10	20	40	80	160
	Integrating flow	Max. 9 digits (switching display using change key) (*4)				
	Analog output	0 to 5 VDC				
	Switch output	1 point (NPN transistor output) (*5)				
	Pulse output (*2)	10 L (normal)/pulse				100 L (normal)/pulse
Power supply voltage V		100 VAC (6 W or less/excluding load current of switch output)				
Cable		Accessory (for between sensor and monitor: 3 m/power supply cable: 2.5 m)				
Mounting	Mounting orientation	Unrestricted in vertical/horizontal directions				
	Straight piping section	IN side: 10D, OUT side: 5D, these are recommended (*3)				
	Degree of protection	IP64 equivalent (only for sensor)				
Weight kg		6.0		7.5		9.5

*1 : Note that condensation may be formed when used in a state with ambient temperature lower than fluid temperature. Be careful that detection failure may occur if transmitted oil is accumulated. Because this kit does not have clean specifications for equipment, the generation of particles occurs on the secondary side. When the ultra clean air is required, it is recommended to install a filter for precise filtration on the end side.

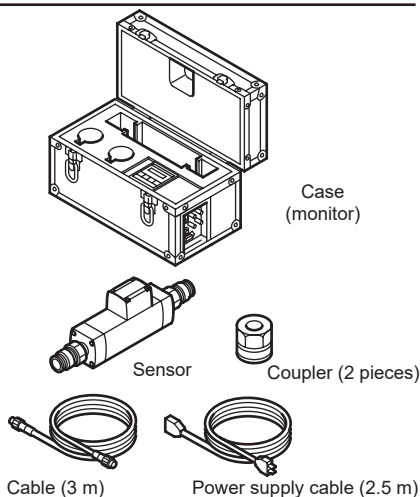
*2 : The pulse output is shared with the switch output. Use this output by switching the function.

*3 : Providing a straight piping section on the upstream side of the coupler (female) is recommended so that the piping conditions do not affect the performance (D is inner diameter of the pipe).

*4 : The data of integrating flow value is backed up regularly. It can also be backed up by operation. Refer to "Functions/operations" on page 1546 for details.

*5 : Only OUT2 can be used. The setting of OUT1 can be made, but there is no output terminal.

Configuration of product



Tester kit PFK Series
Planned for end of production March 2022.

PFK Series

How to order

How to order

● Tester kit

PFK- 402 - 25 N 0

● A Flow rate range

● B Port size

● C Switch output

● D Analog output

Code	Description					
A Flow rate range						
501	25 to 500 L /min(normal)					
102	50 to 1000 L /min(normal)					
202	100 to 2000 L /min(normal)					
402	200 to 4000 L /min(normal)					
802	400 to 8000 L /min(normal)					
B Port size						
	Flow rate range	501	102	202	402	802
15	Coupler for 15 A	●	●			
25	Coupler for 25A			●	●	
40	Coupler for 40A					●
C Switch output						
N	NPN transistor output *1					
D Analog output						
0	0 to 5 VDC					

⚠ Precautions for model No. selection

*1: Only OUT2 can be used. The setting of OUT1 can be made, but there is no output terminal.

*2: For this product, the sensor, monitor, cable and coupler are included in the dedicated trunk case.

Product: PFK-(A)-(B) N0

[Example of model No.]

PFK-402-25N0

● A Flow rate range: 200 to 4000 L/min (normal)

● B Port size : Coupler for 25 A

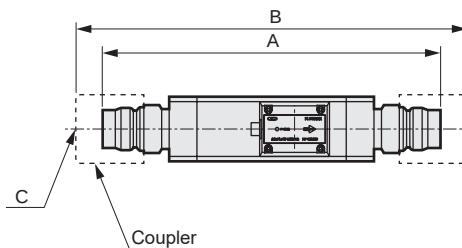
● C Switch output : NPN transistor output

● D Analog output : 0 to 5 VDC

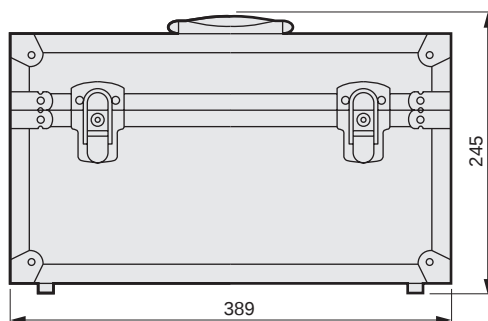
Dimensions

● PFK

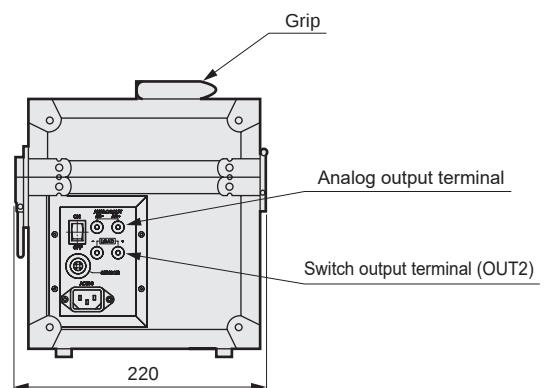
Sensor section



Case



	A	B	C
Sensor for PFK-501 to 102	228	264	Rc1/2
Sensor for PFK-202	285	331	Rc1
Sensor for PFK-402	300	346	Rc1
Sensor for PFK-802	350	402	Rc1 1/2



F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain
Separ
Mech
Press SW
Res press
exh valve
SlowStart
Anti-bac/Bac-
remove Filtr
Film
Resist FR
Oil-ProhR
Med
Press FR
No Cu/
PTFE FRL
Outdrs FRL
Adapter
Joiner
Press
Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/
other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro
Press SW
ContactSW
AirSens
PresSW
Cool
Air Flo
Sens/Ctrl
WaterRISens
TotAirSys
(Total Air)
TotAirSys
(Gamma)
Gas
generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg
etc
Ending

PFD/PFK Series

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FlmResistFR
Oil-ProhR
MedPresFR
No Cu/
PTFE FRL
Outdrs FR
F.R.L
(Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneur
AirBoost
SpdContr
Silncr
CheckV/
other
Jnt/tube
AirUnt
PresCompn
Mech/
ElecPresSw
ContactSW
AirSens
PresSW
Cool
AirFloSens/
Contr
WaterRtSens
TotAirSys
(Total Air)
TotAirSys
(Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg
etc
Ending

Functions and operations for monitor

Switch output lamp

- Lit: Switch ON
- Blinking: Overcurrent protection in operation

Operation lamp

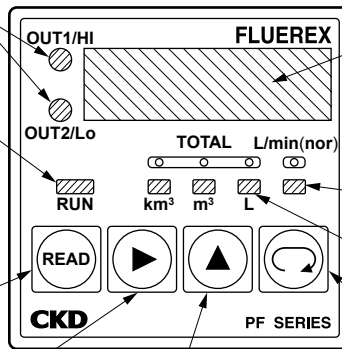
- Lit : Displaying flow rate
- Blinking : Integration stop
- OFF : Setting (confirmation)

[READ] key

- Calling set values

[SHIFT] key

- Shifts blinking area to the right



4-digit digital display

- [Measurement mode]
- Instant/integrating flow display
- Error display
- [Read/write mode]
- Displaying set values

Instantaneous flow rate unit display

- Lit during instantaneous flow rate display

Integrating flow rate unit display

- Lit during integrating flow rate display

[CHANGE] key

- Setting set values
- Change/set unit

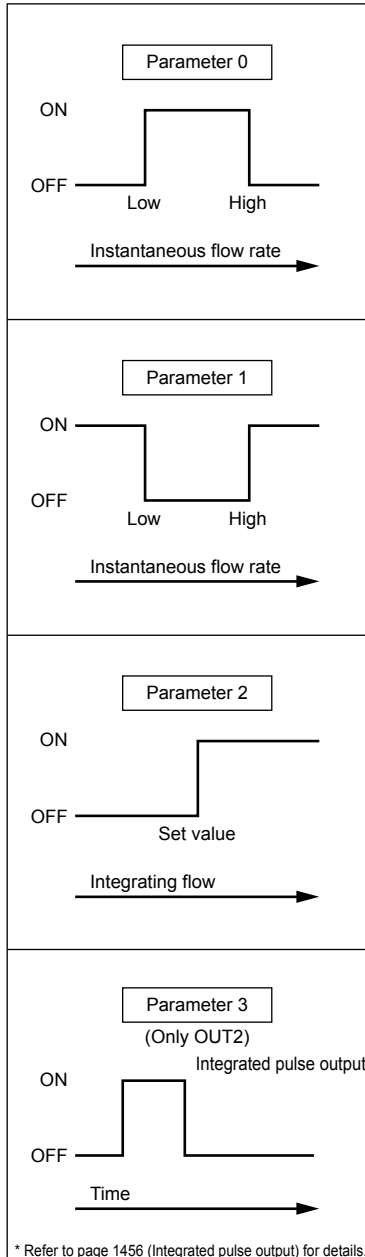
[UP] key

- Increases blinking digits

Measurement mode

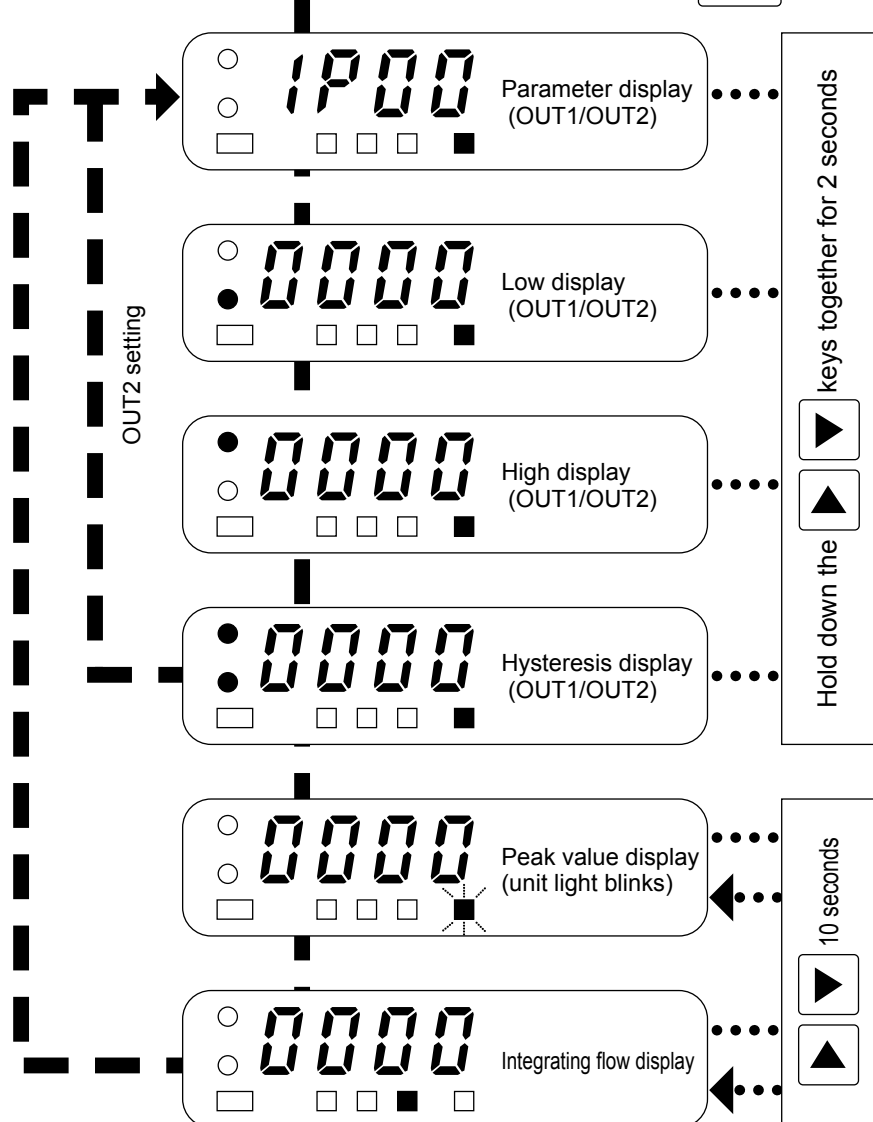
Switch parameter

Four types of setting are available according to the application.



* Refer to page 1456 (Integrated pulse output) for details.

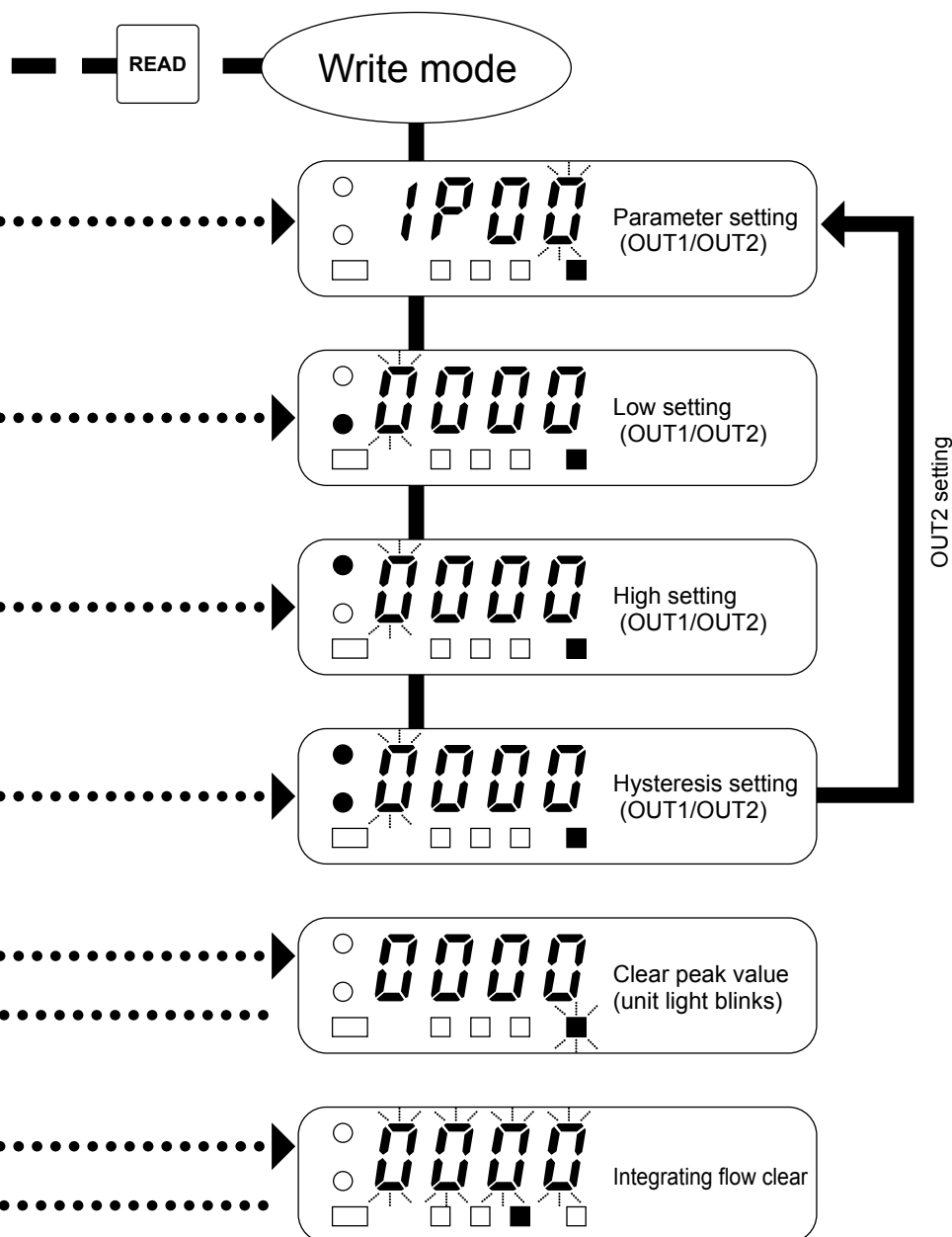
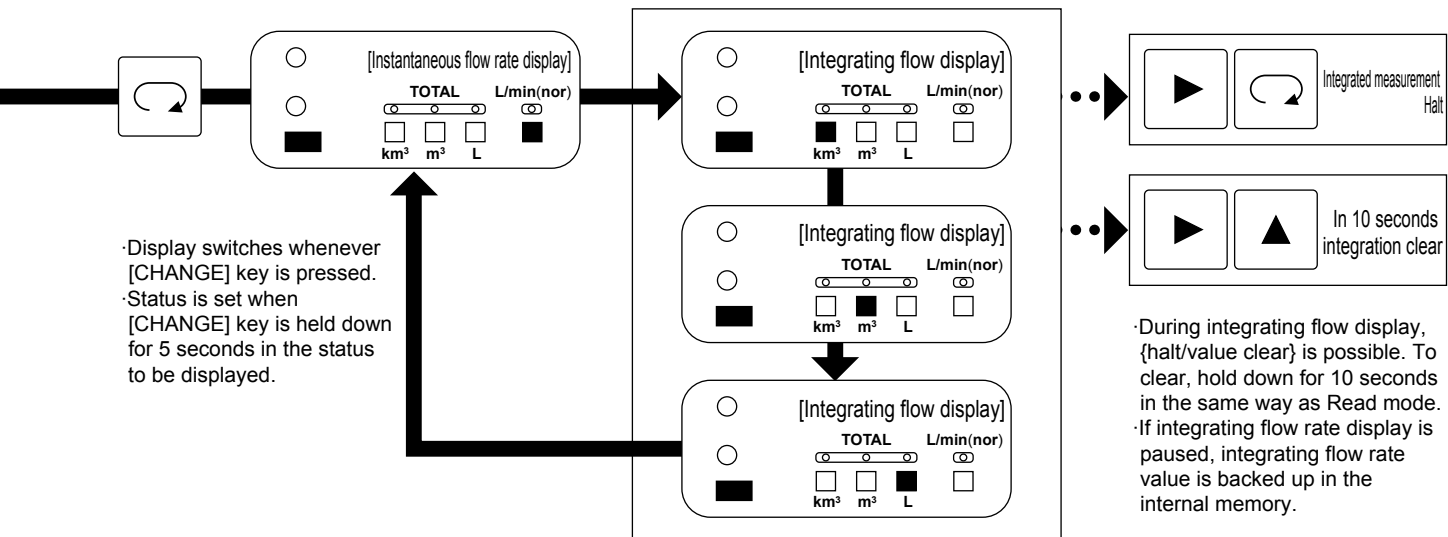
Read mode



* For parameter 2, it is (integrated switch set values) instead of (L) (H) (h).

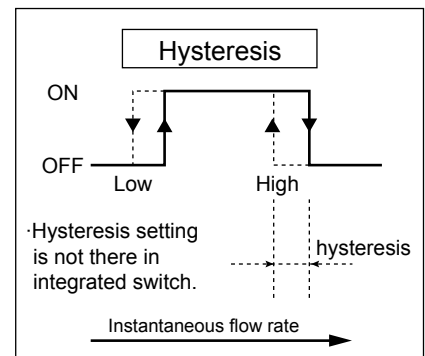
* Since there is no setting item for parameter 3, it jumps to (peak value display) in the read mode and (parameter setting) in the write mode.

* Display unit of the integrating flow rate changes by pressing the [SHIFT] (shift key) after setting/confirming the integrating flow rate.



* Peak value/integrating flow rate can be cleared after holding down [SHIFT], [UP] keys together for 10 seconds.

Hysteresis



Integrated pulse output

As for OUT2, if the parameter is set to [3], switch output function is changed to integrated pulse output function. Moreover, note that there is no integrated pulse output function in OUT1.

Backup of integrating flow rate value/peak value

·This product automatically backs up the integrating flow rate value/peak value to the internal memory and the backed-up data is retained even when the power is turned off.

·Timing of backup is as follows.

- 1) If there is a change from the previous integrating flow rate value/peak value after 5 minutes or more from the previous backup.
- 2) If integrating flow stop is executed.
- 3) If the integrated value is cleared. (Peak value backs up the value at that time and integrated value backs up the post-clearance value)
- 4) If the peak value is cleared. (Peak value backs up the post-clearance value and integrated value backs up the value at that time)

·Note that it does not back up in the following cases.

- 1) If less than 5 minutes since the last backup.
- 2) If there is no difference in value after 5 minutes from the last backup.

The value shown at the time of turning ON the power is the value of the last backup.

F.R.L
F (Filtr)
R (Reg)
L (Lub)
PresSW
Shutoff
SlowStart
FimResistFR
Oil-ProhR
MedPresFR
No Cu/ PTFE FRL
Outdrs FR
F.R.L (Related)
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
SpdContr
Silncr
CheckV/ other
Jnt/tube
AirUnt
PrecsCompn
Mech/ ElecPresSw
ContactSW
AirSens
PresSW Cool
AirFloSens/ Contr
WaterRtSens
TotAirSys (Total Air)
TotAirSys (Gamma)
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg etc
Ending

Series variation

Discontinue

Compact flow rate sensor

* Refer to page 1364 for PF Series.

[(For air/nitrogen gas/argon/carbon dioxide/mixed gases (argon + carbon dioxide) RAPIFLOW FSM3 Series)]

RAPIFLOW FSM3/model series variation					
Bar display	LCD display		IO-Link	Body material	
Analog output 1 point Capable of mounting display (optional) FSM3-B□ Series	Analog output 1 point NPN output 1 point/2 points FSM3-L□ Series	Analog output 1 point PNP output 1 point/2 points FSM3-L□ Series	IO-Link communication		
				Resin body	Stainless steel body
FSM3-B005	FSM3-L005-A/B/E/F	FSM3-L005-C/D/G/H	FSM3-C005-L	●	●
FSM3-B010	FSM3-L010	FSM3-L010	FSM3-C010-L	●	●
FSM3-B020	FSM3-L020	FSM3-L020	FSM3-C020-L	●	●
FSM3-B050	FSM3-L050	FSM3-L050	FSM3-C050-L	●	●
FSM3-B100	FSM3-L100	FSM3-L100	FSM3-C100-L	●	●
FSM3-B200	FSM3-L200	FSM3-L200	FSM3-C200-L	●	●
FSM3-B500	FSM3-L500	FSM3-L500	FSM3-C500-L	●	●
FSM3-B101	FSM3-L101	FSM3-L101	FSM3-C101-L	●	●
FSM3-B201	FSM3-L201	FSM3-L201	FSM3-C201-L	●	●
FSM3-B501	FSM3-L501	FSM3-L501	FSM3-C501-L	●	●
FSM3-B102	FSM3-L102	FSM3-L102	FSM3-C102-L	●	●

Note: Refer to "How to order" for details on body material and port size combinations.

* The flow rate range 10 to 100 ℓ/min. is only for air and nitrogen gas.

[(Air/nitrogen gas) Miniature flow rate switch RAPIFLOW FSM-X Series]

RAPIFLOW FSM-X/model No. series variation			Body material	
Analog output 1 point Discrete sensor head	Analog output 1 point Flow path block			
			Resin body	Stainless steel body
FSM-X-AF005	FSM-X-AF005-□		●	
FSM-X-AF010	FSM-X-AF010-□		●	
FSM-X-AF050	FSM-X-AF050-□		●	
FSM-X-AF100	FSM-X-AF100-□		●	
FSM-X-AR005	FSM-X-AR005-□		●	
FSM-X-AR010	FSM-X-AR010-□		●	
FSM-X-AR050	FSM-X-AR050-□		●	
FSM-X-AR100	FSM-X-AR100-□		●	

Note: Refer to "How to order" for details on body material and port size combinations.

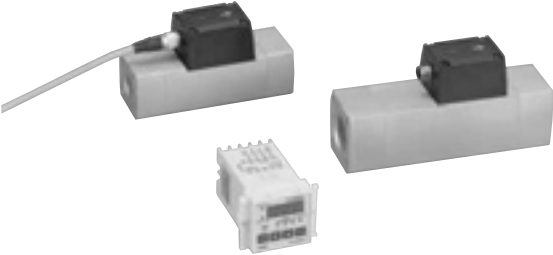
RAPIFLOW FSM-V/model No. series variation				Body material	
Analog output	Switch output				
Analog output 1 point Capable of mounting display (sold separately) FSM-V-A□3-□ Series	NPN output 2 points FSM-V-N□3-□ Series	PNP output 2 points FSM-V-P□3-□ Series			
				Resin body	Stainless steel body
FSM-V-A□3-R0005	FSM-V-N□3-R0005	FSM-V-P□3-R0005		●	
FSM-V-A□3-R0010	FSM-V-N□3-R0010	FSM-V-P□3-R0010		●	
FSM-V-A□3-R0050	FSM-V-N□3-R0050	FSM-V-P□3-R0050		●	
FSM-V-A□3-R0100	FSM-V-N□3-R0100	FSM-V-P□3-R0100		●	
FSM-V-A□3-R0500	FSM-V-N□3-R0500	FSM-V-P□3-R0500		●	
FSM-V-A□3-R1000	FSM-V-N□3-R1000	FSM-V-P□3-R1000		●	

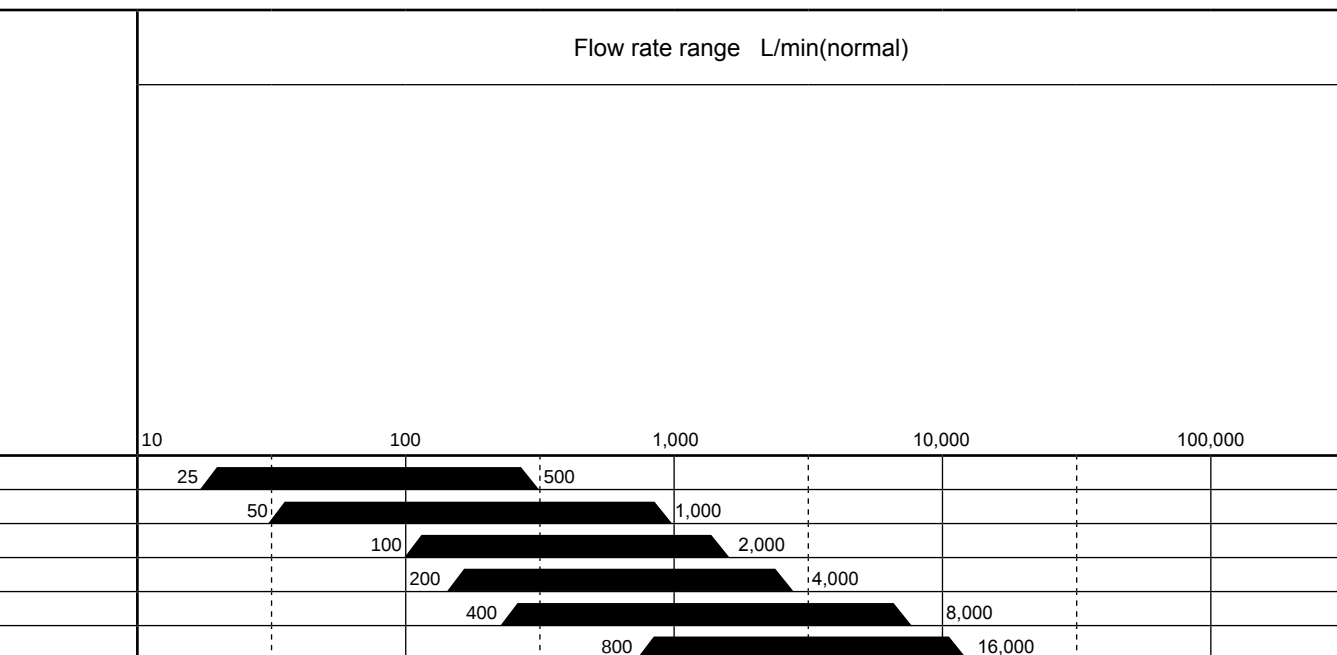
Series variation



Discontinue Pneumatic flow sensor for compressed air

[FLUEREX pneumatic flow sensor PF Series]

FLUEREX flow sensor PF/model No. series variation		
Display separated		
PFD	Transportation measuring tester kit	
		
PFD-501	PFD-501	PFK-501
PFD-102	PFD-102	PFK-102
PFD-202	PFD-202	PFK-202
PFD-402	PFD-402	PFK-402
PFD-802	PFD-802	PFK-802
PFD-163		



	Model No.	Port size						Page
		10A	15A	20A	25A	40A	50A	
Display separated	PFD-501	●						1534
	PFD-102		●					
	PFD-202			●				
	PFD-402				●			
	PFD-802					●		
	PFD-163						●	
Tester kit	PFK-501		●					1540
	PFK-102		●					
	PFK-202				●			
	PFK-402				●			
	PFK-802					●		

F.R.L.
F.R.
F (Filtr)
R (Reg)
L (Lub)
Drain
Separ
Mech
Press SW
Res press
exh valve
SlowStart
Anti-bac/Bac-
remove Filtr
Film
Resist FR
Oil-ProhR
Med
Press FR
No Cu/
PTFE FRL
Outdtrs FRL
Adapter
Joiner
Press
Gauge
CompFRL
LgFRL
PrecsR
VacF/R
Clean FR
ElecPneuR
AirBoost
Speed Ctrl
Silncr
CheckV/
other
Fit/Tube
Nozzle
Air Unit
PrecsCompn
Electro
Press SW
ContactSW
AirSens
PresSW
Cool
Air Flo
Sens/Ctrl
WaterRtSens
TotAirSys
(Total Air)
TotAirSys
(Gamma)
Gas
generator
RefrDry
DesicDry
HiPolymDry
MainFiltr
Dischrg
etc
Ending