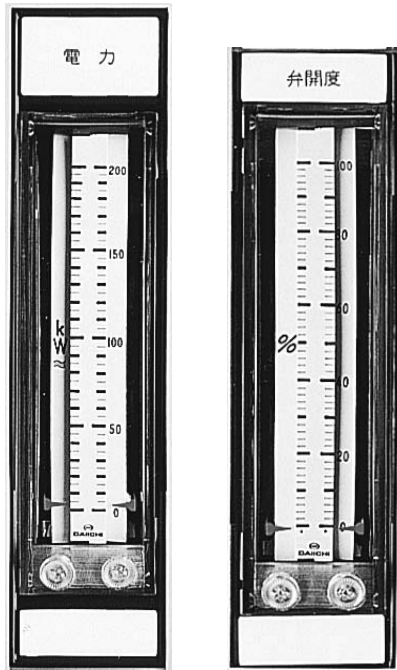


EDGEWISE INSTRUMENT - F SERIES



F-17-2T

F-15-2T

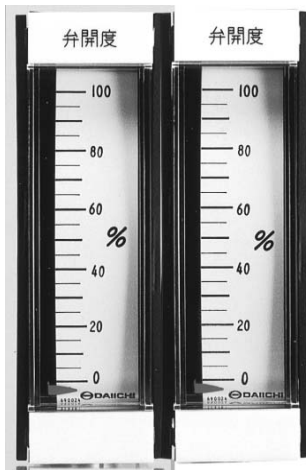
OUTLINE

Regarding the various kinds of modern process control system and electronic equipment, miniaturization of the instrument panel, low power consumption with improvement of safety, reliability pointing for the resource saving and energy saves. In addition, according to requirement from human engineering, product designs have been much improved.

Concerning the electrical indicating meter widely required of better space factor and complete function as man-machine interfaces as well as the improvement of quality and reliability.

Edgewise type instrument (F Series) can respond to a request from user and be used with high reliability, since it has been developed based on the long time experiences of our company as an expertise and specialist manufacturer of the indicating meters.

FEATURES



F-10-1T

- ▶ High quality and high performance meter.
 - ▶ Flanged type.
 - ▶ Meter can be attached or removed from front of panel.
 - ▶ Thin type and multiple attached on panel is possible
 - ▶ 2 pieces of meter element can be built-in (2 pointer type).
- Most suitable for comparative measuring (F-17, 15 only)
- ▶ Name plates were attached on the top and bottom of the meter, so it is possible to indicate the measurement point tag No. etc.
 - ▶ When precise indication is needed the meter can be fine adjustment from rear part.
 - ▶ Received indicator scale of physical value can be manufactured.
 - ▶ Adopting transducer with electronics technology can be chosen the optimum ones from midst of the abundant type for use.
 - ▶ Meter with Incombustible material can be manufactured as specify.

Edgewise Instrument - F Series

TYPE CODE DESIGNATION

(1) F - (2) - (3) - (4)

(1) Type of Measurand

Mark	Measurand	Operation Principle
M	DC current, voltage	Permanent magnet moving coil
X	DC receiving indicator	Permanent magnet moving coil
Y	AC receiving indicator	Rectifier
C	AC current, voltage	Rectifier/ RMS value rectifier
W	AC power	Transducer
WVB	Reactive power (balanced)	Transducer
WV	Reactive power (unbalanced)	Transducer
PB	Power factor (balanced)	Transducer
P	Power factor (unbalanced)	Transducer
A	Frequency	Transducer

(2) Shape

Mark	Edgewise Instrument
17	170 × 40
15	150 × 40
10	100 × 30

(3) Meter Mounting Direction

Mark	Mounting Direction
1T	1 pointer vertical type
1Y	1 pointer horizontal type
2T	2-pointer vertical type
2Y	2-pointer horizontal type

(4) Kind of Circuit

Mark	Circuit
12	Single phase
13	Single phase 3-wire
33	Three phase 3-wire
34	Three phase 4-wire

Edgewise Instrument - F Series

COMMON STANDARD SPECIFICATIONS

ITEM	SPECIFICATION	
Standard	JIS1102:2007 [Electric Indicating Meter Direct Acting Type] Compliant IEC 60051-1 Compliant	
Class	Refer to [List of F Series]	
Support system	Pivot system (Part of system is Taut band)	
Swing angle of meter	45°	
Dimensions meter from front	F-17: 170×40mm F-15: 150×40mm F-10: 100×30mm	
Length of scale	F-17, 15: 90mm F-10: 66mm	
Color of scale plate	White	
Pointer	Triangle (Red)	
Installation posture	Vertical type, Horizontal type	
Material panel	Iron & non-iron plate	
Thickness panel	7mm or less	
Color of cover (Color of the collar frame F-series)	F-17, 15	Black (Munsell N1.5), Dark blue (Munsell 7.5BG 4/1.5)
	F-10	Black (Munsell N1.5)
Material of case (Material of the mounting frame F-series)	Aluminum die-cast (For F-17, 15 only) Fixing frame for F-10 is integral construction with base ABS resin.	
Insulation resistance	Between electric circuit and outer case	DC500V, 50MΩ or more
Voltage test	Between electric circuit and outer case	AC3320V, between 5sec.
Safety requirements	Standard	JIS C 1010-1
	Insulation	Between electric circuit and outer case : Base of insulation
	Use	For indoor use (Cubicle etc.)
	High altitude	2000m or less
	Pollution	Pollution level 2
	Measure category	CAT III
	Max. circuit voltage	600V (Ammeter)
Operated temperature/ Humidity limit	-10~55°C, Average day temperature 40°C or less, 25~85% RH (Reference ambient temperature 45°C for steel ship rules)	
Storage temperature range	-20~70°C	

STANDARD SCALE DIVISION

Max. scale value (10-time)	1	1.5	2	2.5	3	4	5	6	7.5	8	9
F-17, F-15	50	75	40	50	60	40	50	60	75	40	45
F-10	20	30	40	25	30	40	25	30	37.5	40	45

Edgewise Instrument - F Series

COMMON SPECIAL SPECIFICATIONS (Please Specify)

ITEM		SPECIFICATION
Scale	Color line	Red, Green, Blue, Yellow (please specify)
	Extend scale	CF: 2~5-time extend
	Color area (bar)	Red, Green, Blue, Yellow (please specify)
	Double scale	Please specify
	Double seal	Please specify
	Max. scale division	F-17,15:100 division ; F-10:75 division
	Special mark	Please specify
Tropical specification		Rust preventative, 「FOR TROPICS」 will display at the name plate
Pointer		Rod shape (black), combine use with multiple scale etc.
Control pointer		Lancet shape (red), 2 control pointer also possible to manufacture (red×2)
Installation posture		Horizontal, or Inclined (specify the angle)
Material of flame retardant		Cover Polycarbonate resin
For SCR control waves use		AC current, AC voltage, wattmeter, reactive power, frequency
For cycle control use		AC current, AC voltage (Rectifier Type)
Test report		Specify the useful frequency and number copies of report require
Scale (single item)		Please specify
Terminal cover		Please consultation with us
Others		Please consultation with us for special frequency

ITEM TO SPECIFY WHEN PURCHASE

- 1).Type Name
- 2).Rated (Max. scale/ Input) *1
- 3).Color of cover
- 4).Terminal cover (specify if require)
- 5).Units
- 6).Options (Refer to Common Special Specification)
- 7).Test report (specify useful frequency and number of copies require)

*1. For max.scale value watt or var meter, please refer to List of Standard Max. Scale Value.
Please specify frequency of the power factor meter according to the specification.

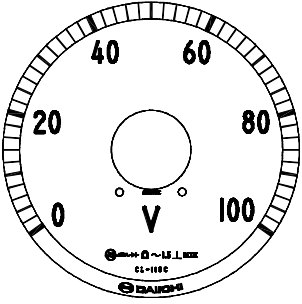
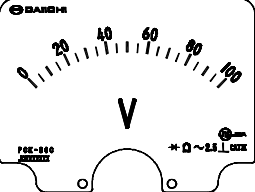
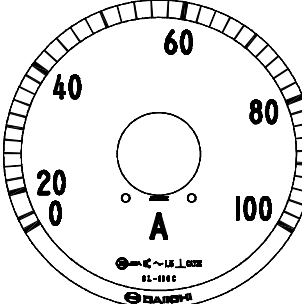
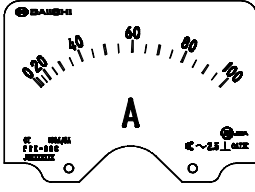
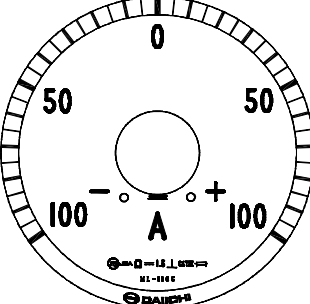
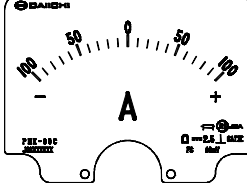
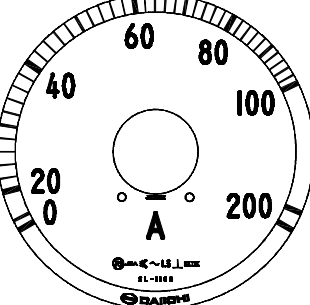
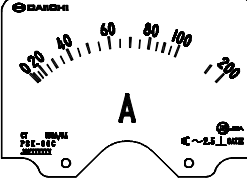
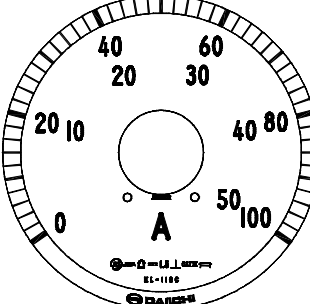
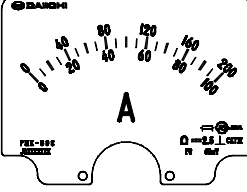
Edgewise Instrument - F Series

LIST OF FK SERIES

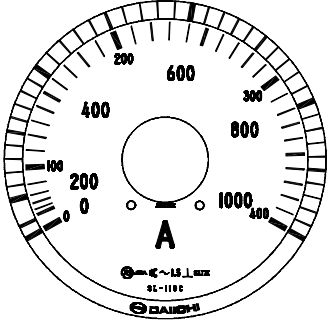
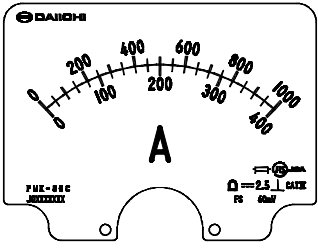
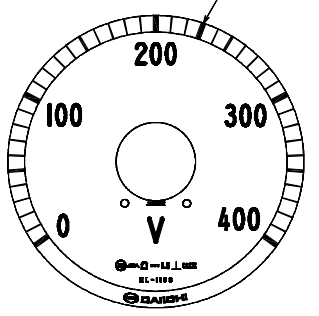
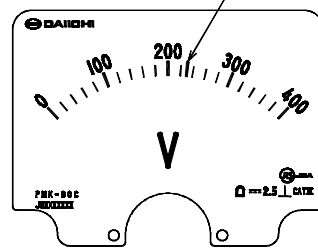
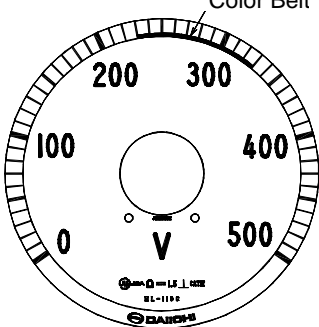
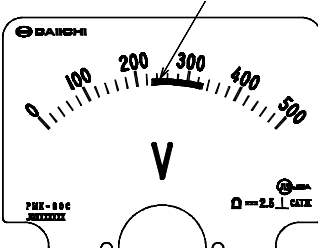
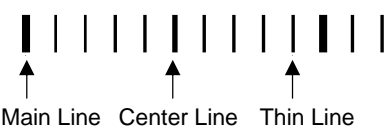
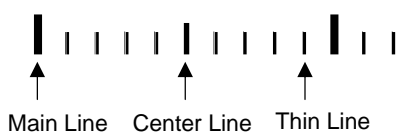
MODEL		F - 17		F - 15		F - 10		
Product	Principle	Type	Class	Type	Class	Type	Class	
DC Ammeter	Moving coil	MF-17-□	1.0	MF-15-□	1.0	MF-10-□	2.5	
DC Voltmeter		MF-17-□	1.0	MF-15-□	1.0	MF-10-□	2.5	
DC Receiving Indicator	Moving coil	XF-17-□	1.0	XF-15-□	1.0	XF-10-□	2.5	
AC Receiving Indicator	Rectifier	YF-17-□	1.5	YF-15-□	1.5	YF-10-□	2.5	
AC Ammeter	Rectifier	CF-17-□	1.5	CF-15-□	1.5	CF-10-□	2.5	
AC Voltmeter		CF-17-□	1.5	CF-15-□	1.5	CF-10-□	2.5	
Watt Meter	Single phase	Transducer	WF-17-□-12	1.5	WF-15-□-12	1.5	WF-10-□-12	2.5
	Single phase 3-wire		WF-17-□-13	1.5	WF-15-□-13	1.5	WF-10-□-13	2.5
	3 phase		WF-17-□-33	1.5	WF-15-□-33	1.5	WF-10-□-33	2.5
	3 phase 4-wire		WF-17-□-34	1.5	WF-15-□-34	1.5	WF-10-□-34	2.5
Var Meter	Single phase	Transducer	WVF-17-□-12	1.5	WVF-15-□-12	1.5	WVF-10-□-12	2.5
	3 phase (unbalanced)		WVF-17-□-33	1.5	WVF-15-□-33	1.5	WVF-10-□-33	2.5
	3 phase 4-wire		WVF-17-□-34	1.5	WVF-15-□-34	1.5	WVF-10-□-34	2.5
Power Factor Meter	Single phase	Transducer	PF-17-□-12	5.0	PF-15-□-12	5.0	PF-10-□-12	5.0
	3 phase (balanced)		PBF-17-□-33		PBF-15-□-33		PBF-10-□-33	
	3 phase (unbalanced)		PF-17-□-33		PF-15-□-33		PF-10-□-33	
	3 phase 4-wire (balanced)		PBF-17-□-34		PBF-15-□-34		PBF-10-□-34	
	3 phase 4-wire (unbalanced)		PF-17C-□-34		PF-15-□-34		PF-10-□-34	
Frequency Meter	Transducer	AF-17-□	1.0	AF-15-□	1.0	AF-10-□	1.0	

► Keep in mind please, Transducer type meter does transitional indication at voltage input start.

EX. SCALE

Scale Specification	Wide Angle Meter Ex.: L-110C	Square Shape Meter Ex.: PK-80C
<p>Standard Scale</p> <p>Scale digit: Black Scale line : Black Unit mark : Black Scale division : Refer to standard lancet shape pointer division</p>		
<p>Moving iron type can be left out the lower value part of scale Scale division : Refer to standard lancet shape pointer division</p>		
<p>± Scale Meter (Both Side Deflect Meter)</p> <p>Scale digit: Black Scale line : Black Unit mark : Black</p>		
<p>Extend Scale (2-Fold Extend)</p> <p>Scale digit: Black ; Extend part: Red Scale line : Black ; Extend part: Red Unit mark : Black</p>		
<p>Single Scale Double Seal Meter</p> <p>Scale digit: Black Scale line : Black Unit mark : Black Standard place a seal of scale figure : Higher value will display at inside & smaller value will display at outside</p>		

EX. SCALE

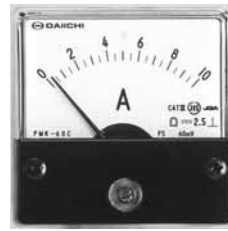
Scale Specification	Wide Angle Meter Ex.: L-110C	Square Shape Meter Ex.: PK-80C
<p>Double Scale Double Seal</p> <p>Scale digit: Black Scale line : Black Unit mark : Black Scale division : Refer to standard lancet shape pointer division Standard place a seal of scale figure : Higher value will display at outside & smaller value will display at inside For wide angle meter : Higher value will display at inside & smaller value will display at outside</p>		
<p>Coloring Scale (Color Line)</p> <p>Scale color line : Red, Yellow, Green Possible combine the color line & color figure to use for double scale</p>		
<p>Color Belt</p> <p>Color Belt : Red, Yellow, Green</p>		
<p>Scale line and Scale figure</p> <p>1) Type of scale line Scale figure will print at main line Please refer to standard lancet shape pointer division & standard knife shape pointer division</p> <p>2) Figure of scale : Max. 4-digit (9999) If 10000 is exceed, unit will be change like 6.6kV or use multiple like $36 \times 1000 \text{min}^{-1}$</p> <p>3) Please have a consultation with us if scale division is different with standard division (odd scale) Please specify for Max. division</p> <p>4) Display 「0」 will be left out if the scale figure after decimal point is Zero. (like scale figure 1 as below)</p> <p>5) Display 「0」 will be left out if the scale figure before decimal point is Zero. (like scale figure 0.5 as below)</p> <p>Ex. : For range value 1.5</p> <p>Wide Angle Meter Scale will display by 「1.0」 for wide angle meter (except BRL & RL series)</p> <p>Square Share Meter BRL & RL series is same scale as square share meter</p>		

§ Wide Angle METER §

STANDARD DIVISION OF LANCET-SHAPED POINTER



L series



PK series

MODEL	L-65C PK-60C, 80C, 100C LK-8C, 10C BRL-110CH Instant Meter		RL-80C PK-120C LK-12C F-10	
MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1		20		20
1.5		30		30
2		20		40
2.5		25		25
3		30		30
4		20		40
5		25		25
6		30		30
7.5		15		37.5
8		16		40
9		18		45

§ Wide Angle METER §



LK series



F series



F series

MODEL	RL-110C BRL-110CH Utility meter		F-15, 17 Note) 4-digit scale of 2T is not manufacturable. L-110C L-80C EL-110C		
	MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1	*2 0 2 4 6 8 10		50	*2 0 2 4 6 8 10	50
1.5	0 5 10 15		30	*8 0 5 10 15	75
2	*2 0 5 10 15 20		40	0 5 10 15 20	40
2.5	*4 0 5 10 15 20 25		50	0 5 10 15 20 25	50
3	0 10 20 30		30	*8 0 5 10 15 20 25 30	60
4	*2 0 10 20 30 40		40	0 10 20 30 40	40
5	*4 0 10 20 30 40 50		50	0 10 20 30 40 50	50
6	0 20 40 60		30	*8 0 10 20 30 40 50 60	60
7.5	0 20 40 60 75		37.5	I-110 & I-80: 37.5 DIVISION *9 0 20 40 60 75	75
8	0 20 40 60 80		40	0 20 40 60 80	40
9	0 30 60 90		45	*5 0 20 40 60 80 90	45

§ Wide Angle METER §

STANDARD DIVISION OF KNIFE-EDGE POINTER

MODEL	PK-60C, 80C, 100C LK- 8C, 10C FK- 5C,		PK-120C LK- 12C FK- 7C		
	MAX. SCALE VALUE	SCALE DIVISION DIAGRAM	DIV.	SCALE DIVISION DIAGRAM	DIV.
1	0 2 4 6 8 10		50	0 2 4 6 8 10	50
1.5	0 5 10 15		30	0 2 4 6 8 10 12 14 15	75
2	0 5 10 15 20		40	0 5 10 15 20	40
2.5	0 5 10 15 20 25		50	0 5 10 15 20 25	50
3	0 10 20 30		30	0 5 10 15 20 25 30	60
4	0 10 20 30 40		40	0 10 20 30 40	80
5	0 10 20 30 40 50		50	0 10 20 30 40 50	50
6	0 20 40 60		30	0 10 20 30 40 50 60	60
7.5	0 20 60 60 75		37.5	0 20 40 60 75	75
8	0 20 40 60 80		40	0 20 40 60 80	80
9	0 30 60 90		45	0 30 60 90	45

- ▶ Division line part of is omitted for moving iron type meter.
- ▶ For scale extended meter, red color line and numbers of extended part.
- ▶ Have a consultation with us for +/- meter, notation of max. scale value, multiple scale meter, etc.
- ▶ *1, becomes 15 divisions for scale extended ammeter PK-60C, PK-80C and LK-8C.
- ▶ *2, becomes 20 divisions for scale extended ammeter PK-120C, LK-12C, F-10, 15, 17, RL-80C and RL-110C.
- ▶ *3, becomes 15 divisions for scale extended ammeter PK-120C, LK-12C, F-10, 15, 17 and RL-80C.
- ▶ *4, becomes 25 divisions for scale extended ammeter RL-110C.
- ▶ *5, seal numbers: 0, 30, 60, 90 for type meter F-15, and 17.
- ▶ *6, becomes 16 divisions for scale extended ammeter PK-120C, LK-12C, F-10, RL-80C.
- ▶ *7, becomes 18 divisions for scale extended ammeter PK-120C, LK-12C, F-10, RL-80C.
- ▶ *8, becomes 30 divisions for scale extended ammeter F-15, 17.
- ▶ *9, becomes 37.5 divisions for scale extended ammeter F-15, 17.