M·SYSTEM CO.,LTD.

Power Transducer Series

MULTI POWER TRANSDUCER

MODEL **LSMT3**

MODEL & SUFFIX CODE SELECTION

LSMT3–AD2

MODEL

AUXILIARY POWER SUPPLY

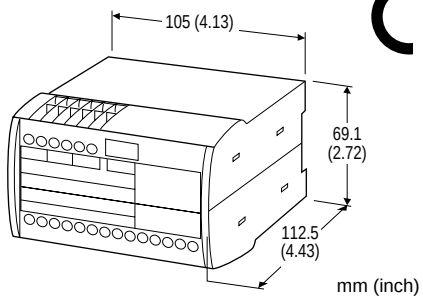
AD2 : 85 – 253V AC / 85 – 253V DC (universal)

ORDERING INFORMATION

Specify code number. (e.g. LSMT3-AD2)
Use Ordering Information Sheet. (No. ESU-1955)

GENERAL SPECIFICATIONS

Construction: Stand-alone; terminal access at the front
Enclosure protection
Terminal block: IP20
Housing: IP40
Connection: Connector type screw terminal block (max. applicable single-core wire size 4.0 mm^2 or multi-strand wire size 2 × 2.5 mm^2)
Configuration: Single phase, 3-phase/3-wire balanced/unbalanced load, 3-phase/4-wire balanced/unbalanced load
Housing material: Flame-resistant resin (grey)
Isolation: Three way (input to each output to power)
Output: Analog output, 3 points
Measured variables
Voltage: U, U12, U23, U31, U1N, U2N, U3N
Current: I, I1, I2, I3, IM, IMS, IB, BS
Active power: P, P1, P2, P3
Reactive power: Q, Q1, Q2, Q3
Apparent power: S, S1, S2, S3
Power factor: PF, PF1, PF2, PF3, QF, QF1, QF2, QF3, LF1, LF2, LF3
Frequency: F
Refer to 'Symbols' for the meaning of each symbol.



Functions & Features

- Measures simultaneously several variables of a heavy-current power system: current, voltage, active power, reactive power, apparent power and power factor
- Programmable 3 analog outputs
- Input voltage up to 693V (phase-to-phase)
- High accuracy: Class 0.5
- AC/DC universal power supply of wide range
- Bent output characteristic selectable
- DIN rail mounting
- Conforms to IEC 60688

Typical Applications

- Supervises variables of an electrical power system at the incoming panel

INPUT

Rated frequency: 50 / 60 Hz
Rated voltage
Phase-to-phase: 100 to 693V
Phase-to-neutral: 57.7 to 400V
Rated current: 1 to 6A
Waveform: Sinusoidal
Programmable input range: See Table 1.
Consumption VA
Current circuit: ≤ $I^2 \cdot 0.01\Omega$ / phase
Voltage circuit: ≤ $U^2 / 400k\Omega$ / phase
Thermal rating

CURRENT INPUT	NUMBER OF INPUTS	OVERLOAD DURATION	INTERVALS
12A	----	Continuous	----
120A	10	1 sec.	100 sec.
120A	5	3 sec.	5 min.
VOLTAGE INPUT (1ph/3ph)	NUMBER OF INPUTS	OVERLOAD DURATION	INTERVALS
480 / 831V	----	Continuous	----
600 / 1040V	10	10 sec.	10 sec.
800 / 1386V	10	1 sec.	10 sec.

Table 1. Programmable Input Range

	X0 (0% input)	X2 (100% input)
P, Q (System)	-X2 ≤ X0 ≤ 0.8 X2	0.3 ≤ X2 / Sr ≤ 1.5
P, Q (L1 / L2 / L3)	-X2 ≤ X0 ≤ 0.8 X2	0.1 ≤ X2 / Sr ≤ 0.5
S (System)	0 ≤ X0 ≤ 0.8 X2	0.3 ≤ X2 / Sr ≤ 1.5
S (L1 / L2 / L3)	0 ≤ X0 ≤ 0.8 X2	0.1 ≤ X2 / Sr ≤ 0.5
PF, QF, LF	-1 ≤ X0 ≤ (X2 – 0.5)	0 ≤ X2 ≤ 1
F	45 Hz ≤ X0 ≤ (X2 – 1) Hz	(X0 + 1) Hz ≤ X2 ≤ 65 Hz
I, I1, I2, I3	0 ≤ X0 ≤ 0.8 X2	0.5 Ir ≤ X2 ≤ 1.2 Ir
IB, BS	X0 = 0	0.5 Ir ≤ X2 ≤ 1.2 Ir
IM	0 ≤ X0 ≤ 0.8 X2	0.5 Ir ≤ X2 ≤ 1.2 Ir
IMS	-X2 ≤ X0 ≤ 0.8 X2	0.5 Ir ≤ X2 ≤ 1.2 Ir
U	0 ≤ X0 ≤ 0.9 X2	0.8 Ur ≤ X2 ≤ 1.2 Ur
U12	0 ≤ X0 ≤ 0.9 X2	0.8 Ur ≤ X2 ≤ 1.2 Ur
U23	0 ≤ X0 ≤ 0.9 X2	0.8 Ur ≤ X2 ≤ 1.2 Ur
U31	0 ≤ X0 ≤ 0.9 X2	0.8 Ur ≤ X2 ≤ 1.2 Ur
U1N	0 ≤ X0 ≤ 0.9 X2	0.8 Ur / √3 ≤ X2 ≤ 1.2 Ur / √3
U2N	0 ≤ X0 ≤ 0.9 X2	0.8 Ur / √3 ≤ X2 ≤ 1.2 Ur / √3
U3N	0 ≤ X0 ≤ 0.9 X2	0.8 Ur / √3 ≤ X2 ≤ 1.2 Ur / √3

OUTPUT

■DC CURRENT

Programmable range

Y2 (100% output): 1 to 20mA

Y0 (0% output): -Y2 to 0.2 Y2

Output limits for input overload:

[Y0 – 0.2 Y2] to Y0 for lower limit

Y2 to 1.2 Y2 for upper limit

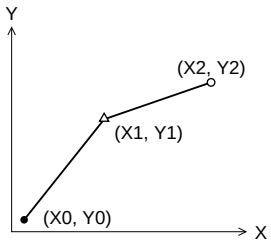
Load resistance: 7.5 / Y2 Ω (max. output drive 7.5V)

■BENT CHARACTERISTIC: 1 break point

Programmable range

X1 (input break point): [X0 + 0.015 X2] thr. 0.985 X2

Y1 (output break point): Y0 thr. Y2



INSTALLATION

Power input

AC: Operational voltage range 85 – 253V, 50/60 Hz, ≤ 7VA

DC: Operational voltage range 85 – 253V, ripple 10% p-p max., ≤ 5W (approx.)

Operating temperature: -10 to +55°C (14 to 131°F)

Storage temperature: -25 to +55°C (-13 to +131°F)

Operating humidity: 90% RH max. (non-condensing)

Vibration: 2G

Mounting: DIN rail

Dimensions: W105×H69.1×D112.5 mm (4.13"×2.72"×4.43")

Weight: 350 g (0.77 lbs)

PERFORMANCE

Reference conditions for accuracy

Ambient temperature: 15 to 30°C

Pre-conditioning: 30 minutes

Power supply: Rating ±1%

Active/reactive factor: cosφ = 1 / sinφ = 1

Waveform factor: 1.1107

Output load: DC current output, 7.5 / Y2 ±1% (Ω)

Ripple: ≤ ±2% of Y2

Dielectric strength: 3700V AC @1 minute (voltage input or current input to power or output or housing)
2200V AC @1 minute (between each voltage input, each current input)
3700V AC @1 minute (power to output or housing)
3700V AC @1 minute (current input to power or output or housing)
490V AC @1 minute (between each output)
490V AC @1 minute (output to housing)

Accuracy class at 100% output

MEASURED VARIABLE	CONDITION	ACCURACY CLASS (%)
System:		
Active, reactive and apparent power	0.5 ≤ X2/Sr ≤ 1.5	0.5 c
	0.3 ≤ X2/Sr < 0.5	1.0 c
Phase:		
Active, reactive and apparent power	0.167 ≤ X2/Sr ≤ 0.5	0.5 c
	0.1 ≤ X2/Sr < 0.167	1.0 c
Power factor	0.5 Sr ≤ S ≤ 1.5 Sr, (X2 – X0) = 2	0.5 c
	0.5 Sr ≤ S ≤ 1.5 Sr, 1 ≤ (X2 – X0) < 2	1.0 c
	0.5 Sr ≤ S ≤ 1.5 Sr, 0.5 ≤ (X2 – X0) < 1	2.0 c
	0.1 Sr ≤ S < 0.5 Sr, (X2 – X0) = 2	1.0 c
	0.1 Sr ≤ S < 0.5 Sr, 1 ≤ (X2 – X0) < 2	2.0 c
	0.1 Sr ≤ S < 0.5 Sr, 0.5 ≤ (X2 – X0) < 1	4.0 c
AC voltage	0.1 Ur ≤ U ≤ 1.2 Ur	0.5 c
AC current	0.1 Ir ≤ I ≤ 1.2 Ir	0.5 c
Frequency	0.1 Ur ≤ U ≤ 1.2 Ur 0.1 Ir ≤ I ≤ 1.2 Ir	0.15 + 0.03 c

Factor ' c ' (the highest value applies)

• Linear characteristic

$$c = \frac{1 - \frac{Y0}{Y2}}{1 - \frac{X0}{X2}} \text{ or } c = 1$$

• Bent characteristic

X0 ≤ X ≤ X1

$$c = \frac{Y1 - Y0}{X1 - X0} \cdot \frac{X2}{Y2} \text{ or } c = 1$$

X1 < X ≤ X2

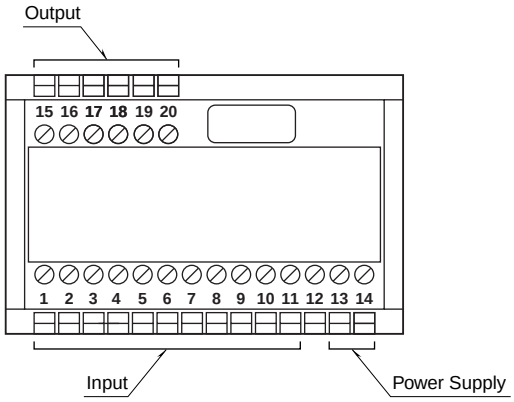
$$c = \frac{1 - \frac{Y1}{Y2}}{1 - \frac{X1}{X2}} \text{ or } c = 1$$

STANDARDS & APPROVALS

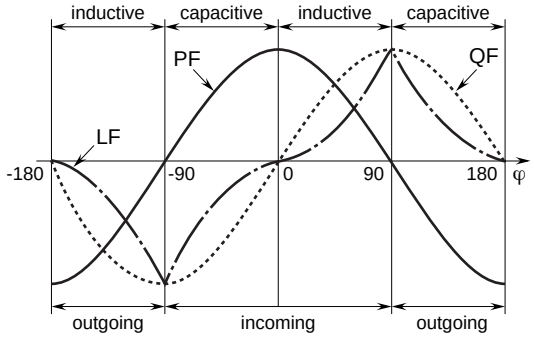
CE conformity: EMC Directive (2004/108/EC)
EMI EN 61000-6-4
EMS EN 61000-6-2
Low Voltage Directive (2006/95/EC)
EN 61010-1
Class II, Installation category III
(at 300V) / II (at 600V), Pollution degree 2

IEC Standard: IEC 60688 usage group II

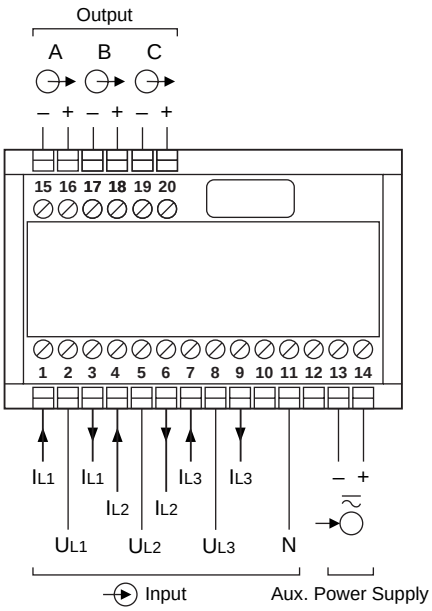
FRONT PANEL CONFIGURATION



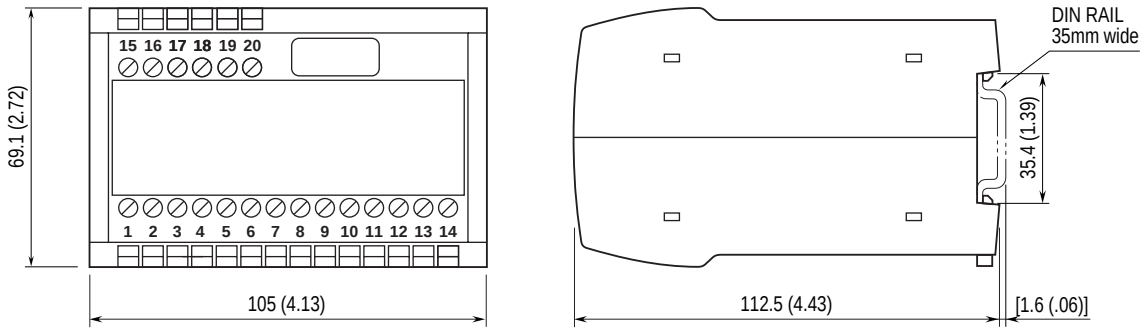
POWER FACTOR RELATIONSHIP



CONNECTION DIAGRAM



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)



•When mounting, no extra space is needed between units.

SYMBOLS

X0	0% input
X1	Input break point
X2	100% input
Y0	0% output
Y1	Output break point
Y2	100% output
Y2SW	100% output setpoint
U	Input voltage
Ur	Rated input voltage
U12	Phase-to-phase voltage, L1 – L2
U23	Phase-to-phase voltage, L2 – L3
U31	Phase-to-phase voltage, L3 – L1
U1N	Phase-to-neutral voltage, L1 – N
U2N	Phase-to-neutral voltage, L2 – N
U3N	Phase-to-neutral voltage, L3 – N
I	Input current
Ir	Rated input currrent
I1	AC current L1
I2	AC current L2
I3	AC current L3
IM	Average current (I1 + I2 + I3) / 3
IMS	Average value of the currents and sign of the active power (P)
IB	RMS value of the current with wire setting range (bimetal measuring function)
BS	Slave pointer function for the measurement of the RMS value IB
φ	Phase-shift between current and voltage
F	Frequency
P	Active power of the system
P1	Active power, phase 1, L1 – N
P2	Active power, phase 2, L2 – N
P3	Active power, phase 3, L3 – N
Q	Reactive power of the system
Q1	Reactive power, phase 1, L1 – N
Q2	Reactive power, phase 2, L2 – N
Q3	Reactive power, phase 3, L3 – N
S	Apparent power of the system
S1	Apparent power, phase 1, L1 – N
S2	Apparent power, phase 2, L2 – N
S3	Apparent power, phase 3, L3 – N
Sr	Rated apparent power
PF	Active power factor cosφ = P / S
PF1	Active power factor 1, P1 / S1
PF2	Active power factor 2, P2 / S2
PF3	Active power factor 3, P3 / S3
QF	Reactive power factor sinφ = Q / S
QF1	Reactive power factor 1, Q1 / S1
QF2	Reactive power factor 2, Q2 / S2
QF3	Reactive power factor 3, Q3 / S3
LF	Power factor of the system, sgnQ (1 – | PF |)
LF1	Power factor phase 1, sgnQ1 (1 – | PF |)
LF2	Power factor phase 2, sgnQ2 (1 – | PF |)
LF3	Power factor phase 3, sgnQ3 (1 – | PF |)
c	Intrinsic error factor