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# AMETEK

## POWER INSTRUMENTS

### Power-Line Carrier

<b>TCF-10B Specifications</b>	
<b>System Specifications</b>	30-535 kHz in 0.5 kHz (500 Hz) steps, transmitter selection in 100 Hz steps
<b>Frequency Range</b>	5,000Q or (1,000Q when strapped for high sensitivity)
<b>4-Wire Receiver Input Impedance</b>	50Q, 75Q or 100Q (nominal unbalanced)
<b>RF Input Impedance</b>	10 watts (max), 0.1 watt (min.)
<b>Output Power</b>	55dB below 10W
<b>Harmonic &amp; Spurious Output</b>	±1dB over temp./voltage range
<b>Output Variation</b>	Frequency-Shift Keyed (FSK); strappable for either two or three-frequency operation
<b>Modulation Type</b>	Narrow shift (± 100Hz)
<b>Frequency Shift</b>	Wide shift (± 250Hz) Extra Wide shift (± 500Hz)
<b>Frequency Stability (All bands)</b>	±10Hz
<b>Nominal Receiver Bandwidths</b>	Narrow Band (380Hz at 3dB points) Wide Band (800Hz at 3dB points) Extra Wide Band (1,600Hz at 3dB points)
<b>In-Band SNR</b>	w/o voice 13dB w/voice 30dB
<b>Receive Sensitivity</b>	(Std. Setting) 22.5mV (min.) to 70V (max.) / -20dBm to +50dBm @ 50Q (High Setting) 5mV (min.) to 17V (max.) / -35dBm to +38dBm @ 50Q

### Frequency Spacing:\*

<b>Narrow Band</b>	Unblock or Transfer Trip	(1-way, 500 Hz) (2-way, 1,000 Hz) <sup>†</sup>
<b>Wide Band</b>	Unblock or Transfer Trip	(1-way, 1,000 Hz)
<b>(Narrow or Wide Shift)</b>	Phase Comparison (SKBU-2A)	(2-way, 2,000 Hz)
	(60Hz sq. wave keying)	(1-way, 1,500 Hz) (2-way, 3,000 Hz)
	Phase Comparison (SPCU-1A)	(1-way, 2,000 Hz)
	(60Hz 3ms pulse keying)	(2-way, 4,000 Hz)
<b>Extra Wide Band</b>	Unblock or Transfer Trip	(1-way, 2,000 Hz)
<b>All Voice Applications</b>	Phase Comparison (SKBU-2A)	(2-way, 4,000 Hz) <sup>†</sup>
	(60Hz sq. wave keying)	(1-way, 1,500 Hz) (2-way, 3,000 Hz) <sup>†</sup>
	Phase Comparison (SPCU-1A)	(1-way, 2,000 Hz)
	(60Hz 3ms pulse keying)	(2-way, 4,000 Hz) <sup>†</sup>
	Minimum Channel spacing	(2-way, 4,000 Hz) <sup>†</sup>

### Channel Speed at 15 dB Margin

<b>Narrow Band</b>	7.5ms*
<b>Wide Band</b>	5.9ms*
<b>Extra Wide Band</b>	4.7ms*

1-way represents transmitter to transmitter or receiver to receiver

2-way represents transmitter to receiver

\* Times do not include logic trip delay or relay operate times.

† An external hybrid or other device offering at least 20dB rejection of the adjacent channel must be used in the application.

## Outputs

<b>Power Supply Module</b>	Loss of dc power
<b>Receiver Module</b>	Low-Signal RF received CLI output for Ext. CLI Meter (-20dB to +10dB; 0—100 ^ A)
<b>Five 1A Isolated outputs for 15/20Vdc or station battery circuits</b>	1) Unblock or Trip or Trip Positive
	2) Low-Level or Low Signal <b>Six (6) contacts for Guard</b>
	3) Make and carry rated 30A for Guard or Trip-Negative <b>or Trip 1 or Trip 2</b> 1 sec.;10A cont. capability
	4) Ni break 50W resistive or Noise 25W with L/R = .045 sec.
	5) Checkback Trip (not used w/Phase Comparison)
<b>Keying Module</b>	Shift High/ Shift Low
<b>10W PA Module</b>	Loss of RF power output

## PLC Power-Line Carrier

### Electro-Mechanical Output Timing

Operate Time		Release Time	
NO Contact	NC Contact	NO Contact	NC Contact
<b>Closes</b>	<b>Opens</b>	<b>Opens</b>	<b>Closes</b>
2.8 ms	2.0 ms	2.8 ms	3.9 ms

1.9 ms bounce 4.0 ms bounce

### Voice Adapter Option Specifications

<b>Modulation</b>	Amplitude Modulation with compandor
<b>Transmission</b>	Full-Duplex
<b>Frequency Response</b>	300 Hz to 2 kHz
<b>Signaling</b>	370 Hz AM w/signaling push-button

### Environmental Specifications

<b>Ambient Temp. range of air</b>	-20 to +60°C (derated per Table 1-14 in system manual) (ANS C37.90)
<b>Relative Humidity</b>	Up to 95% (non-condensing) at 40°C (for 96 hrs. cumulative) (ANS/UL 508)
<b>Altitude</b>	Up to 1,500m (without derating), 6,000m (using Table 1-13 & 1-14 in system manual)
<b>SWC Transient</b>	All external user interfaces meet SWC specifications of ANS C37.90.1 (1989)
<b>1-minute withstand</b>	Only isolated inputs and outputs, and all alarms: 2,500 Vdc from each terminal to ground derated per Table 1-13 in system manual (IEC 255-5)
<b>Center conductor of coaxial cable to ground</b>	3,000 Vdc impulse level, using 1.2 x 50 msec impulse
<b>Electro-Magnetic Interference Compatibility</b>	IEEE Standard (ANS C37.90.2)

## Power Requirement Specifications

Transceiver Supply Current (Amps)  
at Nominal voltage

### Nominal Permissible

Battery Voltage Receive/ 1 Watt 10 Watt

Voltage Range Standby Transmit Transmit

48/60 Vdc	38-70 Vdc	.630	.940	1.600
110/125 Vdc	88-140 Vdc	.240	.360	.600
220/250 Vdc	176-280 Vdc	.120	.180	.300

Permissible ripple on incoming Vdc 5%

Maximum allowable frequency of ripple 120 Hz

Carrier frequency on dc input leads when 20 mV (max)

transmitting 10W

## Altitude Dielectric Strength De-Rating for Air Insulation

Altitude (Meters)	Correction Factor
1,500	1.00
1,800	0.97
2,100	0.94
2,400	0.91
2,700	0.87
3,000	0.83
3,600	0.79
4,200	0.74
4,800	0.69
5,400	0.64
6,000	0.59

Keying Specifications	Altitude Correction for Maximum Temperature of Cooling Air (ANS C93.5)	Temperature (Degrees C)		
		Usual	Unusual	From Usual
Five (5) optically-isolated keying inputs strappable at 15/20, 48, 125, & 250Vdc	1) Unblock or Phase Comparison 2) Direct Transfer Trip 3) Power Boost or 52b keying 4) RF Power On/Off 5) Voice Adapter	1,50055	40	-
Maximum input keying burden	10 mA	2,00053	38	2
Manual Keying	Recessed push-button switches for high and low-freq. keying and power boost	3,00048	33	7
		4,00043	28	12

## Weight and Dimension Specifications

Equipment	Net Weight		Height		Width		Depth		Rack space
	lbs	Kg	in.	mm	in.	mm	in.	mm	
Transceiver	21	9.53	5.25	133.4	19.00	482.6	13.50	342.9	3 RU
Transmitter	14	6.35	5.25	133.4	19.00	482.6	13.50	342.9	3 RU
Receiver	12	5.45	5.25	133.4	19.00	482.6	13.50	342.9	3 RU

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