CAN BUS KEYPAD

Engineered for Off-Highway Vehicles

- Five standard keypad form factors available
- J1939 and CANopen versions
- Dimmable LED indicators and legends
- Sealed to IP67
- Vibration and impact resistant
- Operating temp: -40 °C to +85 °C
- Long life: 1,000,000 cycles per key
- Support for multiple key press combinations
- Designed for 12/24 volt systems

3KG1 CUSTOM OPTIONS

Custom configurations are available.
Contact Grayhill to build your custom part number.

- Custom keytop legends
- Up to 3 LED indicators per key
- Indicator colors:
  Red, Amber, Green, Blue
- Custom backlight colors:
  Red, Amber, Green
- Factory configured parameters

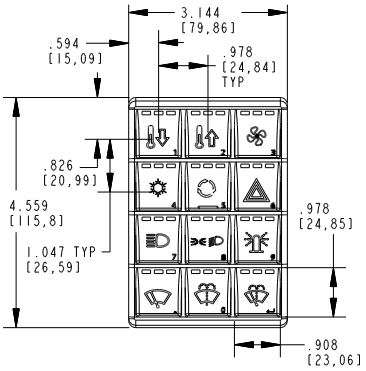
YOUR EXPERTS IN CAB CONTROLS

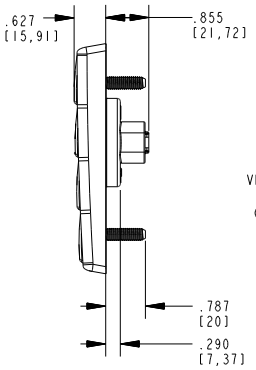
Grayhill specializes in the design, development, and production of human interface controls, including:

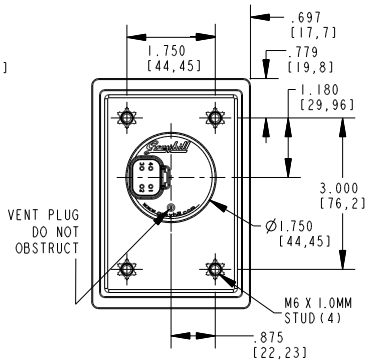
- Cab user interface design
- Customized control panels
- CAN bus interface devices

DIMENSIONS in inches [and millimeters]

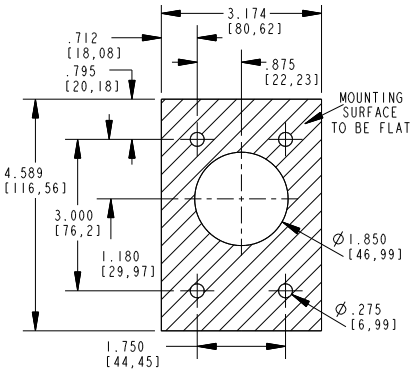
4×3 Keypad



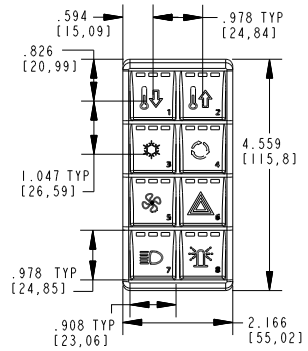


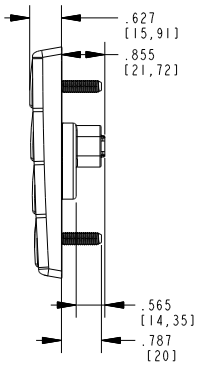


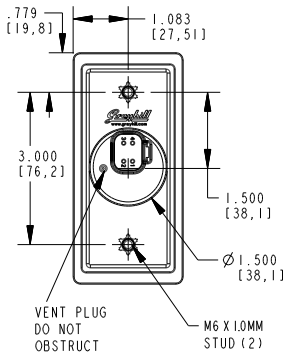
Panel Cut-Out Geometry



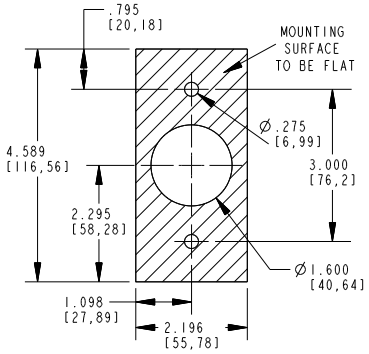
4×2 Keypad



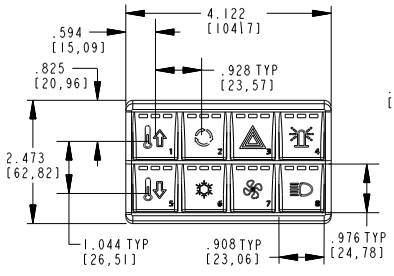


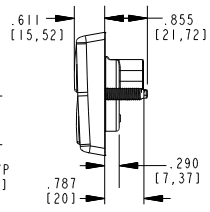


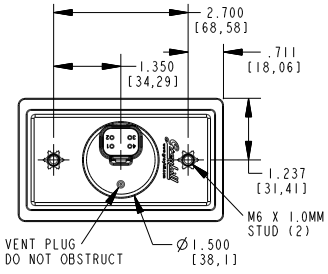
Panel Cut-Out Geometry



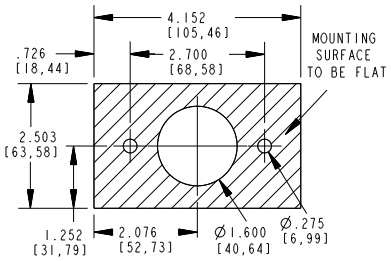
2×4 Keypad



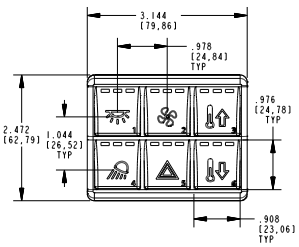


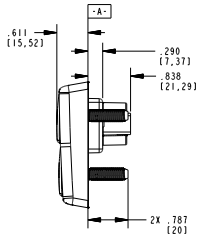


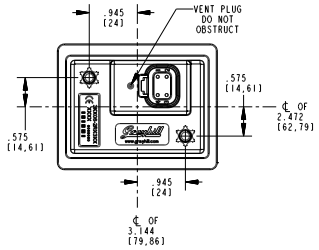
Panel Cut-Out Geometry



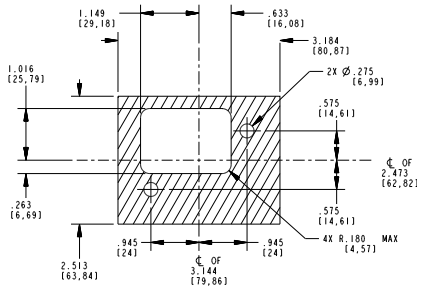
2×3 Keypad







Panel Cut-Out Geometry

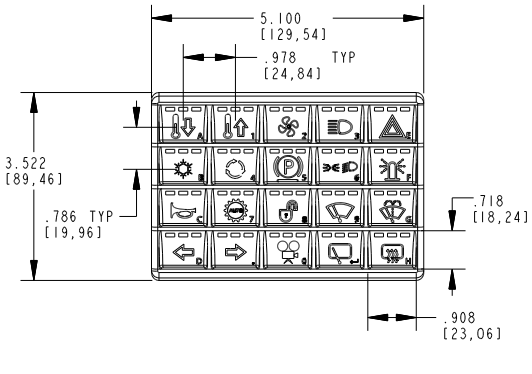


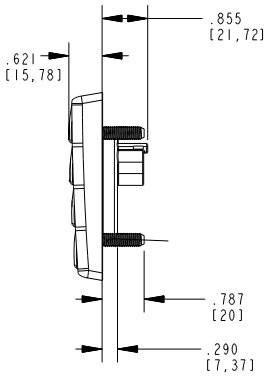
Specifications are subject to change.

DIMENSIONS in inches [and millimeters]

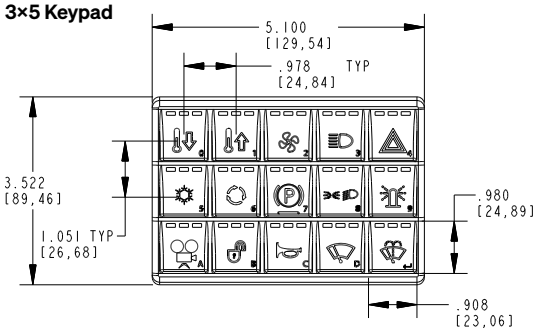
ISO Symbols shown in dimensional drawings

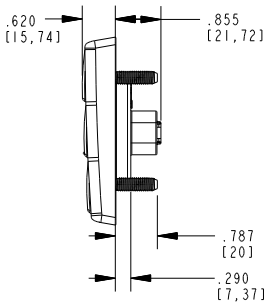
4×5 Keypad



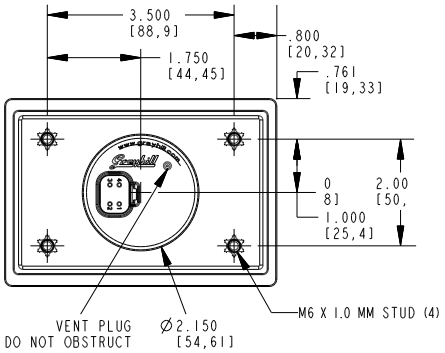


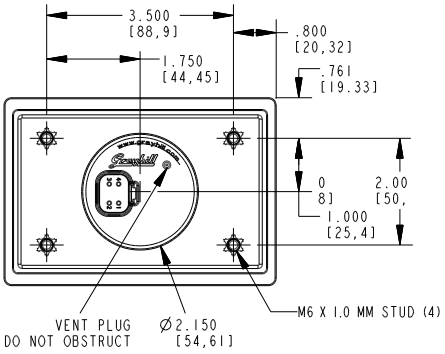
3×5 Keypad





Panel Cut-Out Geometry for 4×5 and 3×5 Keypads





Standard Legend Sets

3K115-3RC3AG

3K112-4RC3AG

3K108-4RC3AG

3K208-4RC3AG

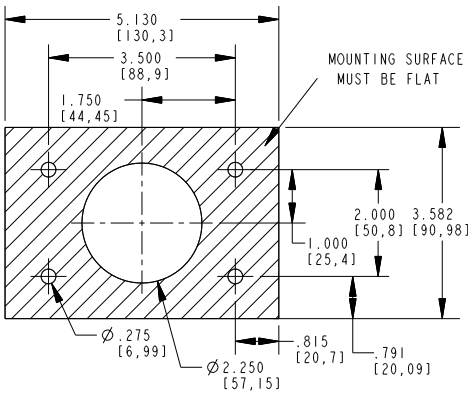
3K120-4RC3AG

3K108-2RC3AG

3K208-2RC3AG

Mounting Information

Use M6 nut (1 mm pitch); Max torque 25 in-lbs



CONNECTION

4 pin Deutsch DT Connector.
Power with 8V to 32V vehicle type inputs.

Pin 4: CAN L
Pin 3: CAN H

Pin 1: Power
Pin 2: Ground

SPECIFICATIONS

Environmental Testing Standards

Operating temperature, High	ANSI/ASAE EP455 5.1.1 Level 2	+85 °C for 11 hrs
Operating temperature, Low	ANSI/ASAE EP455 5.1.1 Level 2	-40 °C for 4 hrs
Storage Temperature, High	ANSI/ASAE EP455 5.1.2 Level 2	+85 °C 4 hrs
Storage Temperature, Low	ANSI/ASAE EP455 5.1.2 Level 2	-40 °C 4 hrs
Thermal Shock	ANSI/ASAE EP455 5.1.3	-40 °C to 70 °C at a rate of 4 °C/min (1 hr at extremes)
Altitude (Barometric Pressure)	ANSI/ASAE EP455 5.2	101.3 kPa to 18.6 kPa
Sand and Dust	ANSI/ASAE EP455 5.3	24 hrs with 0.88 g/m3
Solar Radiation	ANSI/ASAE EP455 5.4	43 to 75 W/m2 UV Radiation (280 to 400 nm wavelength) for 300 h
Wash Down	ANSI/ASAE EP455 5.6 Level 2	375 kPa and 8.3 L/min for 10 min @15°C Water temp
Ingress Protection	IP67	1 meter submersion for 30 min
Humidity	ANSI/ASAE EP455 5.13	96% Humidity at 35 °C for 240 hrs
Salt Fog	ANSI/ASAE EP455 5.9	5% aqueous solution of NaCl @ 35 °C and a pH between 6.5 and 7.2 for 48 hrs
Chemical resistance (Resistance to Solvents)	ISO 16750-5 EP 455 (5.8.2)	
Thermal Cycling (Change of Temperature)	ISO 16750-4	-40° to 85°C 2 hours at extremes change rate = 1°C/min (8 hours) repeat for 30 cycles.

Electromagnetic Compatibility Standards

ESD	ANSI/ASAE EP455 5.12	+/- 25 kV for 10 pulses, 5 of each polarity
Radiated Immunity	ISO14982 6.6	10 MHz–1000 MHz range 48 mA bulk Current injection 100 V/m
Conducted Emissions	SAE J1113-41, Control/Signal lines only	Class 3 for 3K120-4RC3AG, 3K108-2RC3AG Class 4 for 3K115-3RC3AG, 3K112-4RC3AG, 3K108-4RC3AG
Broadband Radiated Emissions	ISO14982 6.4	64dB to 54dB, 30 MHz–75 MHz (linearly decreases) 54 dB to 65 dB, 75 MHz-400 MHz (linearly increases) 65 dB, 400 MHz–1000 MHz

Physical Testing Standards

Vibration, Random	ANSI/ASAE EP455 5.15.1	2 hrs each axis @ 52.4 m/s2 RMS overall acceleration and spectral power density of 2 m2/s3 from 50 Hz to 2000 Hz
Vibration, Sinusoidal	ANSI/ASAE EP455 5.15.2	A logarithmic sweep from 10 Hz to 2000 Hz to 10 Hz over a period of 20 min for 4 hrs in each of 3 orthogonal axes with amplitude of 1.5 mm from 10 Hz to 40 Hz and a constant acceleration of 35 m/s2 RMS from 40 Hz to 2000 Hz
Shock / Crash Safety	ANSI/ASAE EP455 5.14	A single 11ms half sine pulse of 490 m/s2 in 3 perpendicular axes
Drop	ANSI/ASAE EP455 5.14.2 Level 1	Drop component 400 mm onto a hardwood benchtop on all practical edges
Shipping integrity	International Safe Transit Agency procedure 3A	

Electrical Performance Standards

Maximum Load	ANSI/ASAE EP455 5.1.1 Level 2	-40 °C 4 hrs +85 °C for 11 hrs max l oad applied
Jump Start Forward Voltage	ISO 16750-2	36 V for 60 min
Jump Start Reverse Voltage	ISO 16750-2	-36 V for 60 min
Short Circuit Protection	ISO 16750-2	All outputs to ground for 60 s
Reverse Polarity Protection	ISO 16750-2	28 V for 60 s
Starting Profile	ISO 16750-2	12 V class B, 24 V class A
Battery-Less Operation	ANSI/ASAE EP455 5.11.3 Level 2	Apply 6+12.6 sin(2*pi*f*t) f is swept from 500 Hz to 1.5k Hz 5 min
Load Dump	ISO 7637-2 Test Pulse 5b	Class A
Switching Spikes: Negative	ISO 7637-2 Test Pulse 3a	Class A
Switching Spikes: Positive	ISO 7637-2 Test Pulse 3b	Class A
Wire Harness Inductance	ISO 7637-2 Test Pulse 2a and 2b	Class A
+/- Inductive Load Pulse	ANSI/ASAE EP455 5.11.4	14-300e^(-t/.001)V 1 Hz for 300 cycles
+/- Mutual Coupling	ANSI/ASAE EP455 5.11.6 Level 2	14+200e^(-t/14×10^-6) V 1 Hz for 300 cycles
Alternator Field Decay	ANSI/ASAE EP455 5.11.2	Class A

CE Compliance

Agriculture and Forestry Machinery EMC	ISO 14982	ESA
Construction Machinery EMC	EN 13309:2000	ESA

ORDERING INFORMATION

Customization Options
Contact Grayhill to build your custom part number

- Custom keytop legends
- Up to 3 LED indicators per key
- Indicator colors: Red, Amber, Green, Blue
- Custom backlight colors: Red, Amber, Green
- Factory configured parameters

3 K X X X - X R C 3 A G

Series

Keypad Symbols
0 = Blank
1 = ISO Symbols
2 = Targets (8-key only)

Key Quantity
06 = 2 rows
08 = 2 or 4 rows
12 = 4 rows
15 = 3 rows
20 = 4 rows

Rows
2 = 2
3 = 3
4 = 4

Key Material
R = Rubber

Protocol
C = J1939
N = CANopen

Default