Specifications are subject to change. Please refer to the current datasheet on www.grayhill.com for the most current published specifications for this product.

Grayhill

INTUITIVE HUMAN INTERFACE SOLUTIONS

CAN-bus Keypads 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
- Custom legends and configurations available





3K SERIES KEYPADS CUSTOM 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

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

www.grayhill.com

Agriculture



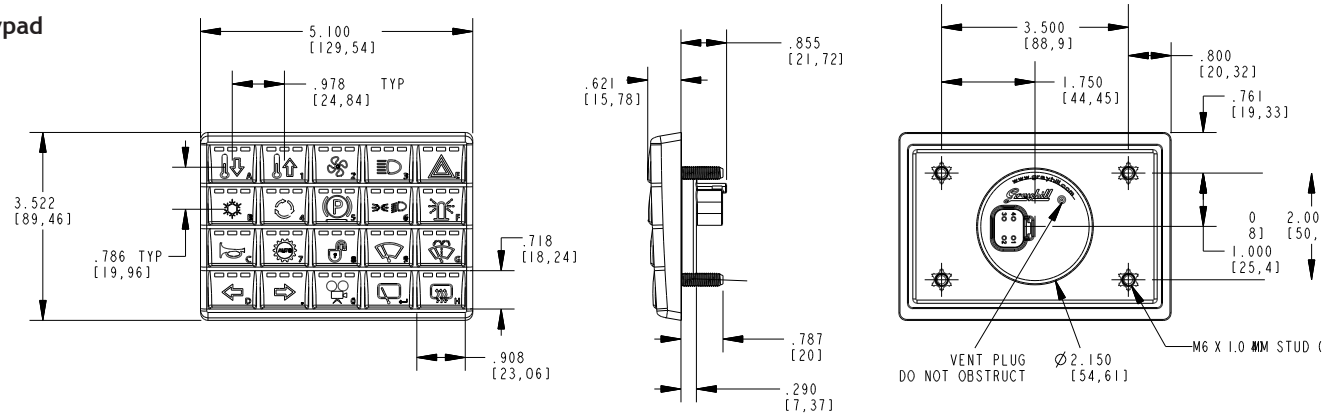
Construction



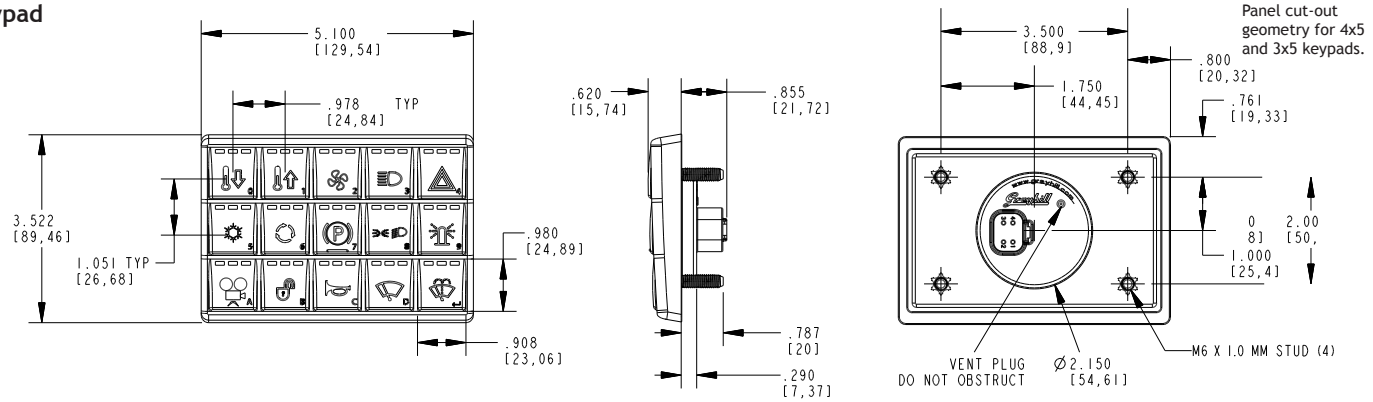
Specifications are subject to change. Please refer to the current datasheet on www.grayhill.com for the most current published specifications for this product.

DIMENSIONS in inches (and millimeters)
ISO Symbols shown in dimensional drawings

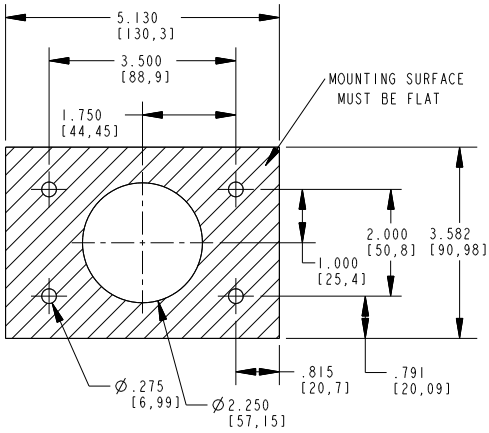
4 x 5 Keypad



3 x 5 Keypad



MOUNTING INFO
Use M6 Nut (1mm pitch)
Max Torque 25 in-lbs



STANDARD LEGEND SETS


3K115-3RC3AG


3K112-4RC3AG


3K108-4RC3AG


3K208-4RC3AG


3K120-4RC3AG


3K108-2RC3AG


3K208-2RC3AG

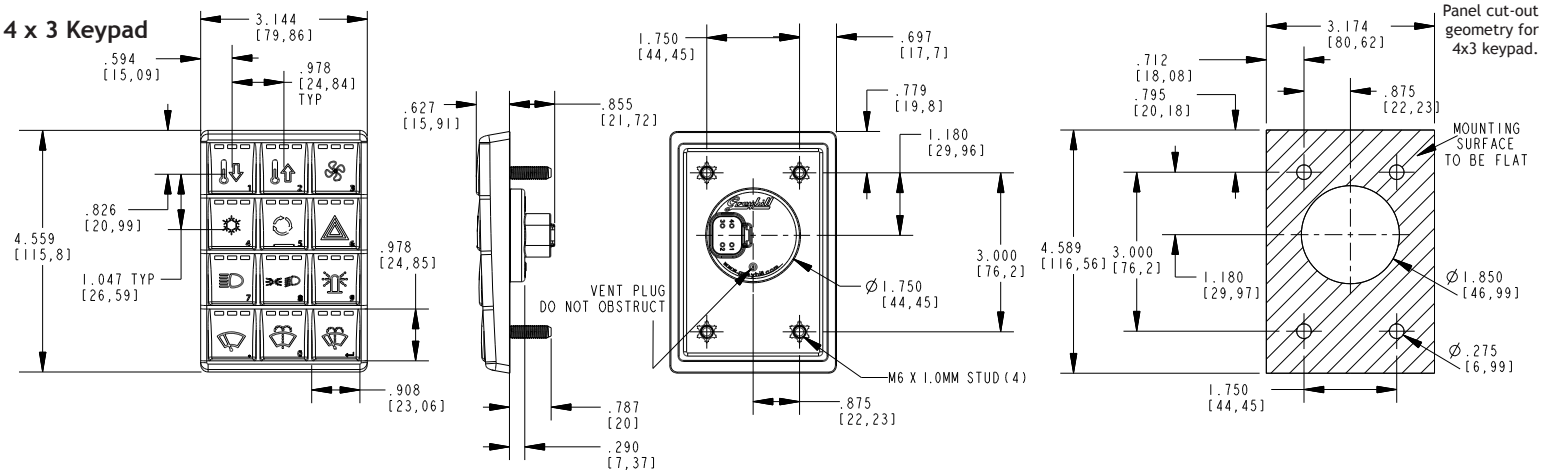
CONNECTION
4 pin Deutsch DT Connector.
Power with 8V to 32V vehicle type inputs.



INTUITIVE HUMAN INTERFACE SOLUTIONS

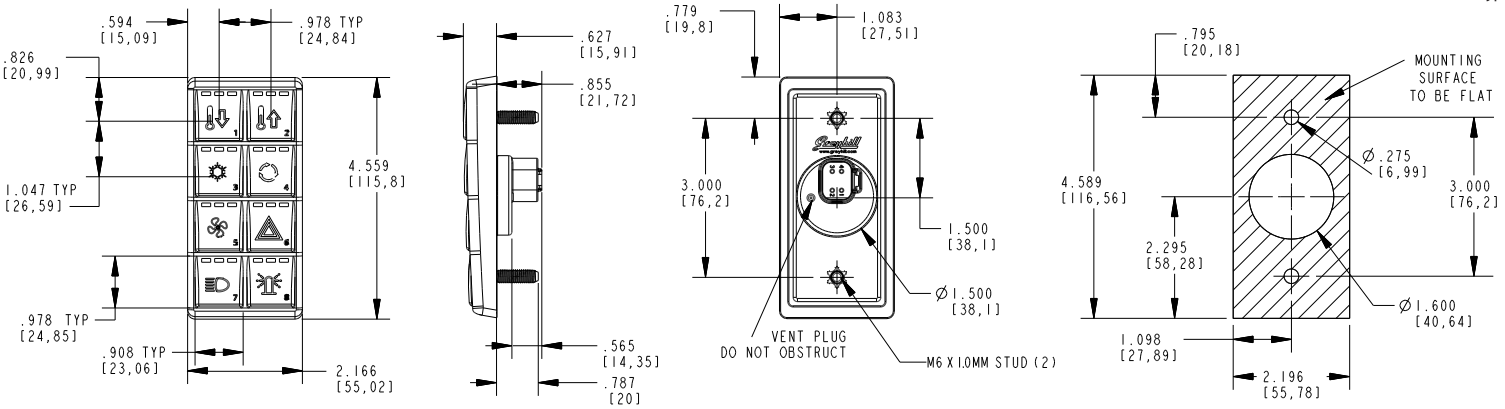
DIMENSIONS in inches (and millimeters)

4 x 3 Keypad



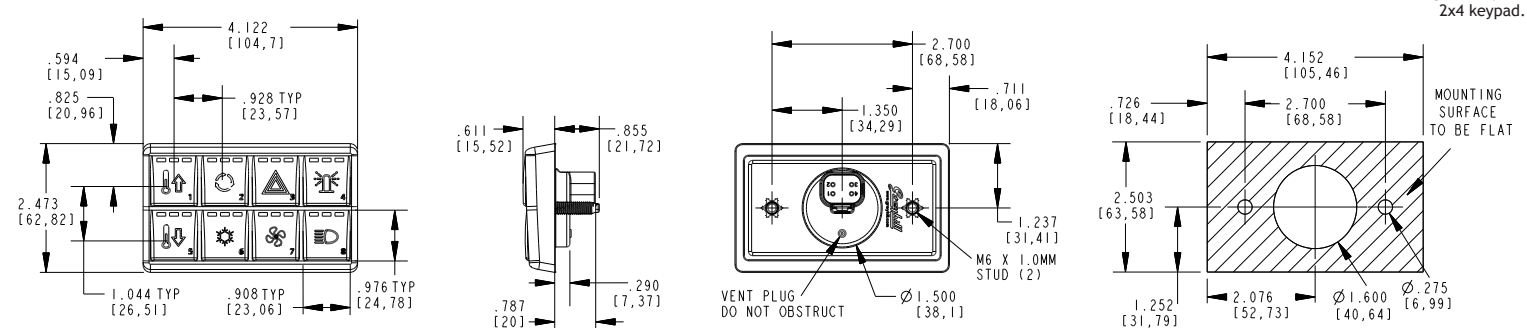
Panel cut-out geometry for 4x3 keypad.

4 x 2 Keypad



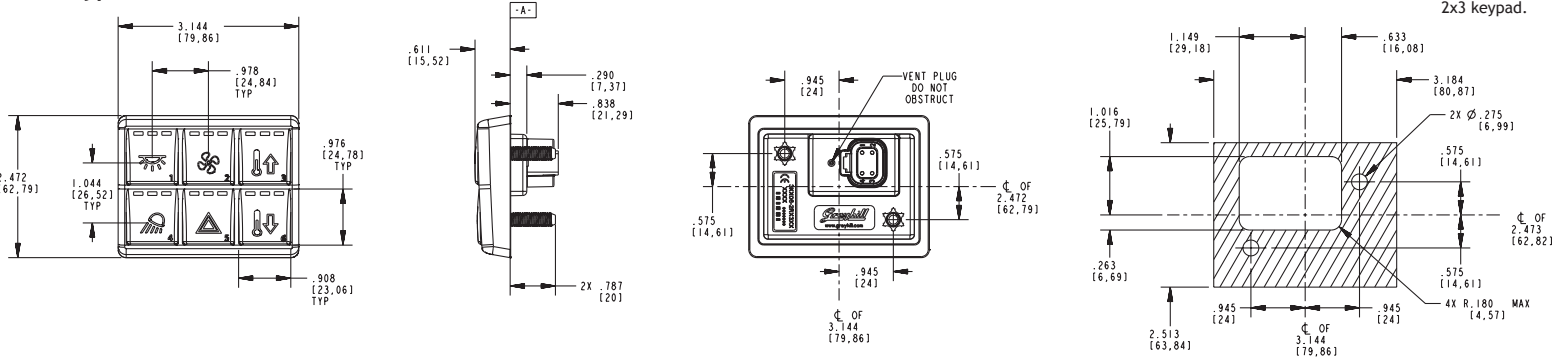
Panel cut-out geometry for 4x2 keypad.

2 x 4 Keypad



Panel cut-out geometry for 2x4 keypad.

2 x 3 Keypad



Panel cut-out geometry for 2x3 keypad.

Specifications are subject to change. Please refer to the current datasheet on www.grayhill.com for the most current published specifications for this product.

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INTUITIVE HUMAN INTERFACE SOLUTIONS

ENVIRONMENTAL TESTING STANDARDS

Operating temperature, High	ANSI/ASAE EP455 5.1.1 Level 2	+85°C for 11 hours
Operating temperature, Low	ANSI/ASAE EP455 5.1.1 Level 2	-40°C for 4 hours
Storage Temperature, High	ANSI/ASAE EP455 5.1.2 Level 2	+85°C 4 hours
Storage Temperature, Low	ANSI/ASAE EP455 5.1.2 Level 2	-40°C 4 hours
Thermal Shock	ANSI/ASAE EP455 5.1.3	-40°C to 70°C at a rate of 4°C/min (1 hour at extremes)
Altitude (Barometric Pressure)	ANSI/ASAE EP455 5.2	101.3kPa to 18.6kPa
Sand and Dust	ANSI/ASAE EP455 5.3	24 hours with 0.88g/m3
Solar Radiation	ANSI/ASAE EP455 5.4	43 to 75W/m2 UV Radiation (280 to 400nm wavelength) for 300h
Wash Down	ANSI/ASAE EP455 5.6 Level 2	375 kPa and 8.3 L/min for 10 minutes @15°C Water temp
Ingress Protection	IP67	1 meter submersion for 30 minutes
Humidity	ANSI/ASAE EP455 5.13	96% Humidity at 35°C for 240 hours.
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 hours
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	+/- 25kV for 10 pulses, 5 of each polarity
Radiated Immunity	ISO14982 6.6	10MHz-1000MHz Range 48mA Bulk Current Injection 100V/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, 30MHz-75MHz (linearly decreases) 54dB to 65dB, 75MHz-400MHz (linearly increases) 65dB, 400MHz-1000MHz

PHYSICAL TESTING STANDARDS

Vibration, Random	ANSI/ASAE EP455 5.15.1	2 hours each axis @ 52.4 m/s2 RMS overall acceleration and spectral power density of 2m2/s3 from 50Hz to 2000Hz
Vibration, Sinusoidal	ANSI/ASAE EP455 5.15.2	A logarithmic sweep from 10Hz to 2000Hz to 10Hz over a period of 20 minutes for 4 hours in each of 3 orthogonal axes with amplitude of 1.5mm from 10Hz to 40Hz and a constant acceleration of 35m/s2 RMS from 40Hz to 2000Hz.
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	

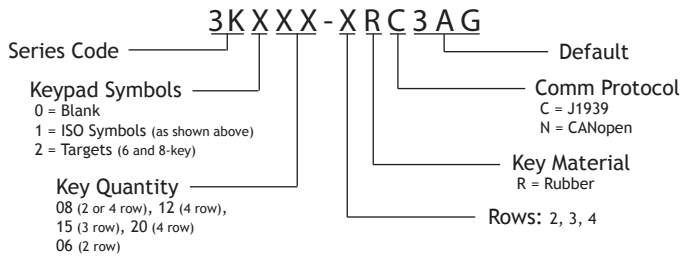
ELECTRICAL PERFORMANCE STANDARDS

Maximum load	ANSI/ASAE EP455 5.1.1 Level 2	-40°C 4 hours +85°C for 11 hours max load applied
Jump start forward voltage	ISO 16750-2	36V for 60 minutes
Jump start reverse voltage	ISO 16750-2	-36V for 60 minutes
Short circuit protection	ISO 16750-2	All outputs to ground for 60s
Reverse polarity protection	ISO 16750-2	28V for 60s
Starting profile	ISO 16750-2	12V class B, 24V class A
Battery-less operation	ANSI/ASAE EP455 5.11.3 Level 2	Apply 6+12.6sin(2*pi*f*t) f is swept from 500Hz to 1.5kHz 5min
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 1Hz for 300 cycles
+/- mutual coupling	ANSI/ASAE EP455 5.11.6 Level 2	14+200e^(-t/14x10^-6)V 1Hz 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

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