Generation 2
Man-Machine Interface (MMI) Controllers

Multi-Functional Control for Intuitive Operation

- Three Mechanical Form Factors:
  - Rotary Encoder with Optional Pushbutton
  - Digital Joystick Encoder with Pushbutton
  - Proportional Joystick with Optional Pushbutton
- Modern Flush Styling
- No-tool Snap-in Front Mounting
- Designed for ISO 13849 Safety Rated Vehicles
- Self-Diagnostics Include:
  - Supply Voltage Monitoring
  - Indicator Operation Verification
  - Button Short Detection
- J1939
- Designed for 12/24 Volt Systems
- Dimmable LED Indicators and Legends
- Low Current Sleep Mode (<1.5 mA Current Draw; Wake Up on Key Press/CAN Message)
- Same Field-tested Reliability as our Original MMI Controllers - Over 500,000 in Operation
- Software Backwards Compatible with our Original VDC
- Customizable Legends, Indicator Colors, Backlight Colors, Knob Colors

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DIMENSIONS in mm [inch]

3JX0X5-G2-100X  
ROTARY ENCODER VERSION

3JX115-G2-100X  
DIGITAL JOYSTICK VERSION

3JX2X5-G2-100X / 3JX305-G2-100X  
PROPORTIONAL JOYSTICK / DUAL PROPORTIONAL OUTPUT VERSION

CONNECTOR: MATES WITH DEUTSCH #DT06-4S WITH W4S WEDGE LOCK.

Pin Signal
1  POWER
2  GROUND
3  CAN_H
4  CAN_L

RECOMMENDED PANEL THICKNESS: 2.5 [0.098] ± 1.0 [0.039]
STANDARD KEYPAD SYMBOL OPTIONS

-0: BLANK

-1: ISO SYMBOLS

-2: GENERIC TARGETS

KNOBS
Contact us about optional knob colors!

LEDS
Contact us for optional LED colors

Indicator colors:
- Amber (Standard)
- Blue
- Green
- Red
- White
- Yellow

Backlight colors:
- Green (Standard)
- White (Standard)
- Amber
- Blue
- Pure Green
- Red
- Yellow

LEGENDS
Contact us for Custom Legends

SERIES CODE
3J X X X 5 G2 X X3A

INPUT TYPE
0 = ROTARY ENCODER
1 = DIGITAL JOYSTICK
2 = PROPORTIONAL JOYSTICK
3 = DUAL PROPORTIONAL OUTPUT JOYSTICK

CENTER PUSHBUTTON / OUTPUT
0 = NO CENTER PUSHBUTTON
1 = CENTER PUSHBUTTON

CONTACT US FOR OPTIONAL LED COLORS

Contact us for optional LED colors

Contact us for optional knob colors!

BACK LIGHT COLOR
G = GREEN
W = WHITE

INCATOR NUMBER/COLOR
3A = 3 AMBER INDICATORS PER KEY

PROTOCOL
C = CANbus J1939

GENERATION CODE
G2 = GENERATION 2

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**PHYSICAL SPECIFICATIONS**

**Vibration, Random**

ISO 16750-3 4.1.2.7

Commercial vehicle, Sprung Masses

**Vibration, Sinusoidal (Resonant Response between 50-80 Hz)**

MIL-STD-202G, Method 204D, Test Condition C

Logarithmic Sweep from 10 Hz - 2000 Hz - 10 Hz over a period of 20 minutes

Duration: 4 hours duration (12 cycles) in each of 3 orthogonal axes.

Maximum displacement for 10Hz - 55Hz: 0.06%.

Constant acceleration for 55Hz - 2000 Hz: 10G.

**Shock/Crash Safety**

ISO 16750-3 4.2.2

10 pulses per direction

**Drop**

ISO 16750-3 4.3

Height: 400 mm

Repeat for all practical edges and faces

**Mechanical Life**

Internal Testing Procedure

Keypad 1M Cycles

Center Pushbutton 1M Cycles

Rotary Encoder 1M Cycles

Optical Joystick 500K Cycles

Proportional Joystick 1M Cycles

Momentary-turn Encoder 1M Cycles

**ELECTRICAL SPECIFICATIONS**

**Maximum Load**

ISO 16750-4 5.1

Low Temp = -40C, High Temp = +85C

Duration: 4 hours at Low Temp, 11 hours at High Temp

Maximum load applied

**Over-voltage**

ISO 16750-2 4.3.2

High Voltage: 36V, Duration: 60 min

Maxim: 20°C

**Superimposed alternating voltage**

ISO 16750-2 4.4

Severity 2 and 3

RI = 50mΩ

Frequency Range: 50Hz to 25kHz

Sweep Duration: 120s

Number of sweeps: 5 (continuously)

**Slow decrease and increase of supply voltage**

ISO 16750-2 4.5

**Momentary drop in supply voltage**

ISO 16750-2 4.6.1

Class B No Reset

**Reset behavior at voltage drop**

ISO 16750-2 4.6.2

Class C

**Starting Profile**

ISO 16750-2 Sec. 4.6.3

Formerly known as pulse 4

12V, Level II Class B and Level IV Class A

24V, Level II Class A and Level III Class A

**Load Dump**

ISO16750-2 sec 4.6.4.2.2

Test A

Formerly known as ISO7637-2 pulse 5

12V: Us = 101V, Ri=0.0Ω, td=600ms

24V: Us = 202V, Ri=0.5Ω, td=400ms

**Reverse Polarization**

ISO 16750-2 4.7.2.3

Voltage: -28V, Duration: 60s

**Open Circuit tests**

ISO 16750-2 4.9.1.2

Relay and signal outputs to be connected to load

**Short-circuit Protection**

ISO 16750-2 4.10.2 Signal Circuits

Connect all signal inputs and outputs to Vmax and GND for 60s. One circuit tested at a time.

**DAMP Heat**

ISO 16750-4 5.7

(Damp Heat)

ISO 16750-4 5.6.2.2 (Humidity Cycling)

96% Humidity at +35°C, Duration: 240 hours

**Thermal Cycling**

Custom Test (Extended Duration Temperature and Humidity Cycling)

Low temperature: -40°C

High Temperature: +85°C

**Chemical Resistance**

ISO 16750-5

(All agents on Table 1 except Battery Fluid)

**ENVIRONMENTAL SPECIFICATIONS**

**Operating temperature**

ISO 16750-4 5.1.1.2

ISO 16750-4 5.1.2.2

Low temperature: -40°C for 24hrs

High temperature: +85°C for 96hrs

**Storage Temperature**

ISO 16750-4 5.1.1.1

ISO 16750-4 5.1.2.1

Low temperature: -55°C

High temperature: +105°C

**Thermal Shock (Ice Water Shock Test)**

ISO 16750-4 5.4.3

High temperature: +85°C

**Altitude (Barometric Pressure)**

ISO60068-2-13 Method 105C

Test Condition B

Sea level to 15240m (101.3 kPa to 11.6 kPa), Exposure Time: 2 hour

**Solar Radiation**

ISO 4892-2 Method B

1000 hours

**Ingress Protection**

IEC 60529 / IEC 20653 8.3.3 - IP6K7

Dust - Talcum powder

Liquid - 1m submersion for 30 minutes

**Wash Down**

SAE J1211 Section 4.4

375 kPa and 8.3 L/min for 10 minutes @ 15°C

**Humidity**

ISO 16750-4 5.7

Humidity at +35°C, Duration: 240 hours

**Salt Fog**

ISO 16750-4 5.5.1

5% aqueous solution of NaCl @ 35°C and a pH between 6.5 and 7.2 for 48 hours

**Thermal Cycling**

Custom Test (Extended Duration Temperature and Humidity Cycling)

Low temperature: -40°C

High Temperature: +85°C

**Chemical Resistance**

ISO 16750-5

(All agents on Table 1 except Battery Fluid)

**ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS**

**Radiated Immunity**

ISO 11452-2 ALSE

80 MHz - 1000 MHz, 200V/m

ISO 11452-2 ALSE

1000 - 2500 MHz, 200V/m, 3-axis

ISO 11452-2 TEM cell

0.01 - 200 MHz, 300V/m

ISO 11452-4

0.5 MHz - 400MHz, 300mA

ISO 11452-5

150 mm Stripline

0.01 MHz - 400Hz, 300mA

**Electrostatic Discharge**

ISO 10605 8 powered-up test

ESD Capacitor Network 330pF, 330Ω,

Conductive Surfaces

Contact Discharge +/-15kV

Non-Conductive Surfaces

Air Discharge +/-25kV

Indirect Discharge +/-20kV

**Electrostatic Discharge**

ISO 10605 9 unpunished test

ESD Capacitor Network 150pF / 2kΩ

Conductive Surfaces

Contact Discharge +/-15kV

Non-Conductive Surfaces

Air Discharge +/-25kV

Indirect Discharge +/-20kV

**Magnetic Field Immunity Test**

ISO 11452-8:2007

15 Hz - 1000 Hz, 100 A/m, Class A

Class A

1 kHz - 10 kHz, 100/15 kHz, 2, Class A

10 kHz - 150 kHz, 1 A/m, Class A

**Radiated Emissions:**

Broadband/Narrowband

ISO14982

CISPR 25

Class 5

(All agents on Table 1 except Battery Fluid)

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