Winnipeg	INSPECTION FORM AUTOMATION – CONTROL CONDUCTORS	Page 1 of 1
		ID:

Project

Facility:	Project Name:
Area :	Bid Opportunity:

Cable/Conduit Data

Source: Dest.:

Installation:
☐ Cable
  ☐ Cable Tray   ☐ Direct Buried
  ☐ Strapped
☐ Conduit
  ☐ EMT
  ☐ Rigid Steel
☐ Alum.
☐ PVC
☐ Other:

No. of Conductors: Size: AWG   Type: Rated Voltage: V

Visual Inspection

Cable Identification Tag Installed: ☐ Yes ☐ No ☐ N/A	Enclosure Entry Acceptable: ☐ Yes ☐ No
Wire tags installed: ☐ Yes ☐ No	Conduit / Cable Supported Appropriately: ☐ Yes ☐ No

Comments:

Insulation Resistance Test

Test Voltage: V   Ambient Temperature: °C   All conductors not under test grounded for each reading: ☐ Yes ☐ No

#	ID	MΩ	#	ID	MΩ	#	ID	MΩ
1			19			37		
2			20			38		
3			21			39		
4			22			40		
5			23			41		
6			24			42		
7			25			43		
8			26			44		
9			27			45		
10			28			46		
11			29			47		
12			30			48		
13			31			49		
14			32			50		
15			33			51		
16			34			52		
17			35			53		
18			36			54		

1. *Utilize 1000VDC Test Voltage for 600V rated cables, 500VDC for cables rated <= 300V.*
2. *Utilize a single form for each cable / conduit.*
3. *Disconnect both ends of wiring prior to tests.*
4. *Test each conductor to ground. All conductors not under test must be grounded during each test.*
5. *Each reading must not be less than 22 MΩ or significantly less than comparable conductors.*

Comments:

Test Summary: ☐ Test Passed ☐ Test Failed

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Winnipeg

INSPECTION FORM
INSTRUMENTATION CABLE – PAIRED (≤ 8 PAIRS)

Page 1 of 1

Cable ID:

Project

Facility: | Project Name:

Area : | Bid Opportunity:

Cable Data

Source: | Dest.:

Installation:
- ☐ Cable
- ☐ Cable Tray
- ☐ Strapped
- ☐ Direct Buried
- ☐ Conduit
- ☐ EMT
- ☐ Rigid Steel
- ☐ Alum.
- ☐ PVC
- ☐ Other:

No. of Pairs: | Size: AWG | Type: | Rated Voltage: V

Visual Inspection

| Cable Identification Tag Installed: | ☐ Yes ☐ No ☐ N/A | Enclosure Entry Acceptable: | ☐ Yes ☐ No |
| Wire tags installed: | ☐ Yes ☐ No | Conduit / Cable Supported Appropriately: | ☐ Yes ☐ No |

Comments:

Insulation Resistance Test

Test Voltage: V | Ambient Temperature: °C | *Utilize 1000VDC Test Voltage for 600V rated cables, 500VDC for cables rated <= 300V.*

Pr	ID	Cond. 1 (+) to Shield (MΩ)	Cond. 2 (-) to Shield (MΩ)	Cond. 1 (+) to Cond. 2 (-) (MΩ)	Shield to Gnd/Armour (MΩ)
1					
2					
3					
4					
5					
6					
7					
8					

Comments:

Test Summary: ☐ Test Passed ☐ Test Failed

Continuity Test

Pr	ID	Cond. 1 (+) & Cond. 2 (-) Loop (Ω)	Cond. 1 (+) & Shield Loop (Ω)	
1				
2				
3				*Short loop at opposite end from measurement.*
4				
5				
6				
7				
8				

Comments:

Test Summary: ☐ Test Passed ☐ Test Failed

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Form F-CBL-INST-PR-8 Rev 00, Created By CENGYS LTD..

Project

Facility:	Project Name:
Area :	Bid Opportunity:

Cable Data

Source: Dest.:

Installation:
☐ Cable
☐ Cable Tray   ☐ Direct Buried
☐ Strapped

☐ Conduit
☐ EMT   ☐ Alum.
☐ Rigid Steel   ☐ PVC

☐ Other:

| No. of Triads: | Size: | AWG | Type: | Rated Voltage: | V |

Visual Inspection

| Cable Identification Tag Installed: | ☐ Yes ☐ No | ☐ N/A | Enclosure Entry Acceptable: | ☐ Yes ☐ No |
| Wire tags installed: | ☐ Yes ☐ No | | Conduit / Cable Supported Appropriately: | ☐ Yes ☐ No |

Comments:

Insulation Resistance Test

Test Voltage: V   Ambient Temperature: °C   *Utilize 1000VDC Test Voltage for 600V rated cables, 500VDC for cables rated <= 300V.*

Pr	ID	Cond. 1 to Shield (MΩ)	Cond. 2 to Shield (MΩ)	Cond. 3 to Shield (MΩ)	Cond. 1 to Cond. 2 (MΩ)	Cond. 1 to Cond. 3 (MΩ)	Cond. 2 to Cond. 3 (MΩ)	Shield to Gnd/Armour (MΩ)
1								
2								
3								
4								
5								
6								
7								
8								

Comments:

Test Summary: ☐ Test Passed   ☐ Test Failed

Continuity Test

Pr	ID	Cond. 1 & Cond. 2 Loop (Ω)	Cond. 2 & Cond. 3 Loop (Ω)	Cond. 1 & Shield Loop (Ω)	
1					
2					
3					*Short loop at opposite end from measurement.*
4					
5					
6					
7					
8					

Comments:

Test Summary: ☐ Test Passed   ☐ Test Failed

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Project

Facility:	Project Name:
Area :	Bid Opportunity:

Cable Data

Source:		Dest. / Load:	

Manufacturer:	Type:	Conductor: ☐ Copper ☐ Aluminum

No. of Conductors:	Size:	☐ AWG ☐ MCM	Length: _____ m	☐ Measured ☐ Previous Data ☐ Jacket Markings ☐ TDR

Rated Voltage: _____ V	Operating Voltage: _____ V	Date Installed:

Installation: ☐ Cable Tray ☐ EMT ☐ Alum. Conduit ☐ Direct Buried Other:
☐ Strapped ☐ Steel Conduit ☐ PVC Conduit ☐ Underground Duct

Visual Inspection

Physical Damage on Exposed Ends:	☐ Yes ☐ No	Cable Identification Tag Installed:	☐ Yes ☐ No
Visual Signs of Overheating:	☐ Yes ☐ No	Cable Supported Appropriately:	☐ Yes ☐ No
Bend Radius Acceptable:	☐ Yes ☐ No	Comments:	

Insulation Resistance Test

Test Preparation:
Source: ☐ Disconnected ☐ Connected with Source Isolated
Cable Dest. / Load: ☐ Disconnected ☐ Connected with Load Isolated
Note: Approval of City's Representative is required, prior to leaving cables connected during the test.

Cable Temperature: _____ °C   Temperature Correction Factor for 20°C: _____   Ground all conductors not under test for each reading.

Test Voltage		Insulation Resistance (MΩ)				Test Summary
		A-GND	B-GND	C-GND	N-GND	☐ Test Passed
_____ V	Reading					☐ Test Inconclusive Further Investigation Required.
	Corrected to 20°C					☐ Test Failed

Utilize 1000VDC Test Voltage for 600V rated cables, 500VDC for cables rated <= 300V.

Comments:

Connection Resistance

Note: Torque check required for all cables. Connection Resistance Test required for cables 4/0 AWG or larger, or as required in the specifications.

Termination	Connection Resistance (µΩ) - As Left				Torque Check
	A	B	C	N	
Source					☐ OK
Dest. / Load					☐ OK

Comments:

Final Analysis

Cable Returned to Service:	☐ Yes ☐ No	Comments:
Monitoring / Further Inspection Required:	☐ Yes ☐ No	
Repair / Replacement Required:	☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Winnipeg

INSPECTION FORM
HEAT TRACE SYSTEM

ID:

Project		
Facility:		Project Name:
Area :		Bid Opportunity:

System Data

Manufacturer:	Model:	Serial Number:
Voltage: V	Nominal Cable Power: W/m	Cable Length: m
Other:		

Visual Inspection / Cleaning

System Identification Tag Installed: ☐ Yes ☐ No	Connections: ☐ Good ☐ Acceptable ☐ Poor
Controls: ☐ N/A ☐ Good ☐ Acceptable ☐ Poor	Insulation: ☐ Good ☐ Acceptable ☐ Poor
Ground Connection: ☐ Good ☐ Acceptable ☐ Poor	
Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor	Unit Cleaned: ☐ Yes Photograph Taken: ☐ Yes
Comments:	

Insulation Resistance Test

Test Preparation: Source: ☐ Disconnected   ☐ Connected with Source Isolated

Cable Temperature: °C   Temperature Correction Factor for 20°C: Ground all conductors not under test for each reading.

Test Voltage		Insulation Resistance (MΩ)				Test Summary
		1-GND	**2-GND**	**3-GND**	**N-GND**	☐ Test Passed
V	Reading					☐ Test Inconclusive Further Investigation Required.
	Corrected to 20°C					☐ Test Failed

Comments:

Power Test

☐ Not Applicable   Ambient Temperature   °C

Voltage: V	Current: V
Total Power: W	Power per meter: W / m

Test Summary   ☐ Test Passed   ☐ Test Inconclusive. Further Investigation Required.   ☐ Test Failed

GFCI Test

Ground Fault Test: ☐ Passed   ☐ Failed

Comments:

Final Analysis

Returned to Service: ☐ Yes ☐ No	Comments:
Monitoring / Further Inspection Required: ☐ Yes ☐ No	
Repair / Replacement Required: ☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

INSPECTION FORM
HEATER, ELECTRIC

Winnipeg

ID:

Project

Facility:	Project Name:
Area :	Bid Opportunity:

System Data

Voltage: V	Phase:	Power:
Manufacturer:	Model:	Serial Number:
Other:		

Visual Inspection / Cleaning

System Identification Tag Installed: ☐ Yes ☐ No	Connections: ☐ Good ☐ Acceptable ☐ Poor
Controls: ☐ N/A ☐ Good ☐ Acceptable ☐ Poor	
Ground Connection: ☐ Good ☐ Acceptable ☐ Poor	

Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor	Unit Cleaned: ☐ Yes	Photograph Taken: ☐ Yes

Comments:

Insulation Resistance Test

Test Preparation:	Source: ☐ Disconnected		☐ Connected with Source Isolated
Cable Temperature: °C Temperature Correction Factor for 20°C:			Ground all conductors not under test for each reading.

Test Voltage		Insulation Resistance (MΩ)				Test Summary
		A-GND	B-GND	C-GND	N-GND	☐ Test Passed
V	Reading					☐ Test Inconclusive Further Investigation Required.
	Corrected to 20°C					☐ Test Failed

Comments:

Power Test

☐ Not Applicable	Ambient Temperature: °C

Voltage at Heater:	☐ A-N ☐ A-B V		Current	Ph A: A
	☐ B-N ☐ B-C V			Ph B: A
	☐ C-N ☐ C-A V			Ph C: A
Total Power: W				

Test Summary	☐ Test Passed	☐ Test Inconclusive. Further Investigation Required.	☐ Test Failed

Final Analysis

Returned to Service:	☐ Yes ☐ No	Comments:
Monitoring / Further Inspection Required:	☐ Yes ☐ No	
Repair / Replacement Required:	☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

Project	
Facility:	Project Name:
Area :	Bid Opportunity:

Instrument (Sensor / Element)		
Tag:	Description:	
Manufacturer:	Model:	Serial Number:

Transmitter		
Tag:	Description:	
Manufacturer:	Model:	Serial Number:
Units:	Design Range: -	
Output	☐ 4-20 mA ☐ Modbus ☐ Other: ☐ 0-10 V ☐ Ethernet IP	

PLC / DCS	
I/O Address:	EU Range:

Inspection Checklist		
No.	Item to be Inspected	Comments	Pass (P/F)
1.	Instrument type and class per P&ID and specification		
2.	Instrument tag(s) installed and correct		
3.	Installation of sensor complete and correct		
4.	Block and drain valves		
5.	Pneumatic / hydraulic tubing leak tested		
6.	Heat tracing / insulation / instrument housing		
7.	Impulse lines pressure tested		
8.	Wiring correct		
9.	Drawings marked up as-built		
10.	HMI Graphic symbol, tag and units correct		

Signal Validation					
Input Signal	Location	Design Value	Actual Value	Error (%)	Pass (P/F)
	Transmitter Display				
	Transmitter Output				
	Process Display				
	PLC				
	HMI				
	Transmitter Display				
	Transmitter Output				
	Process Display				
	PLC				
	HMI				
	Transmitter Display				
	Transmitter Output				
	Process Display				
	PLC				
	HMI				

Notes:

1.   Attach factory calbration forms for all instruments where provided and/or specified.
2.   Provide instrument parameters for each parameter changed from the factory default.

Comments:

	Company	Name	Signature	**Date** (yyyy/mm/dd)
Tested By				
Witnessed By				

Project

Facility:	Project Name:
Area :	Bid Opportunity:

Motor Data

Size: kW / HP	Voltage: V	R.P.M:
Manufacturer:	Model:	Serial Number:
Frame Type:	FLA: A	Service Factor:	Other:
Cooling: ☐ Air ☐ Fan	# Cooling Fans:	Winding Material:

Visual Inspection / Cleaning

Motor Identification Tag Installed: ☐ Yes ☐ No	Visual Signs of Overheating: ☐ Yes ☐ No
Connections: ☐ Good ☐ Acceptable ☐ Poor	Air Baffles: ☐ Good ☐ Acceptable ☐ Poor
Paint: ☐ Good ☐ Acceptable ☐ Poor	Filter Media: ☐ N/A ☐ Good ☐ Acceptable ☐ Poor
Cooling Fans: ☐ N/A ☐ Good ☐ Acceptable ☐ Poor	Fan Controls: ☐ N/A ☐ Good ☐ Acceptable ☐ Poor
Anchorage/Alignment: ☐ Good ☐ Acceptable ☐ Poor	
Ground Connection: ☐ Good ☐ Acceptable ☐ Poor	
Mechanical/Electrical Noise During Operation: ☐ Yes ☐ No	Lubrication Required: ☐ Yes ☐ No
Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor	Unit Cleaned: ☐ Yes Photograph Taken: ☐ Yes

Winding Insulation Resistance

Stator Winding	Test Voltage (Vdc)	Winding Temperature (°C)	Resistance (MΩ)			Dielectric Absorption Ratio	Polarization Index (a)
			30 Sec	1 min.	10 min. (a)		
	500					-	-
		40					
	500					-	-
		40					
	500					-	-
		40					

Notes:

(a)   Testing to 10 minutes and calculation of Polarization Index is only required for motors > 150 kW (200 HP)

Test Summary   ☐ Test Passed   ☐ Test Inconclusive. Further Investigation Required.   ☐ Test Failed

Winding Resistance

Resistance (µΩ)			Test Summary
A - B	B – C	A - C	☐ Test Passed ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed
Comments:			

Winnipeg

Bearing Insulation Resistance

☐ Not Applicable

Bearing	Test Voltage (Vdc)	Bearing Temperature (°C)	Resistance (MΩ)	
			1 min.	Corrected to 40°C
	500			
	500			
Test Summary	☐ Test Passed	☐ Test Inconclusive. Further Investigation Required.		☐ Test Failed

RTD / Thermistor Resistance

☐ Not Applicable

Actual Winding Temperature: _____ °C   Actual Bearing Temperature _____ °C

Thermistor / Switch	Resistance (Ω)	Thermistor / Switch	Resistance (Ω)	Thermistor / Switch	Resistance (Ω)
RTD	Resistance (Ω)	Calculated Temperature (°C)	RTD	Resistance (Ω)	Calculated Temperature (°C)
Test Summary	☐ Test Passed	☐ Test Inconclusive. Further Investigation Required.		☐ Test Failed	

Note: Test connection resistance of bolted connections. Report on cable inspection sheet.

Final Analysis

				Comments:
Returned to Service:	☐ Yes	☐ No		
Monitoring / Further Inspection Required:	☐ Yes	☐ No		
Repair / Replacement Required:	☐ Yes	☐ No		

	Company	Name	Signature	Date (yyyy/mm/dd)
Performed By				
Checked By				

Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

INSPECTION FORM
VALVE, ACTUATED, ON-OFF

Winnipeg

ID:

Project

Facility:	Project Name:
Area :	Bid Opportunity:

Valve Data

Service Fluid:	Valve Size: ____ mm	Valve Type:
Valve Manuf.:	Valve Model:	Serial Number:
Actuator Type: ☐ Solenoid ☐ Pneumatic ☐ Electric	Limit Switches: ☐ Opened ☐ Closed ☐ Other:	
Actuator Manufacturer:	Actuator Model:	Serial Number:

Visual Inspection / Cleaning

Valve Identification Tag Installed: ☐ Yes ☐ No

Connections: ☐ Good ☐ Acceptable ☐ Poor

Paint: ☐ Good ☐ Acceptable ☐ Poor

Hazardous Location Requirements: ☐ Not Required ☐ Installed Correctly ☐ Deficient

Mechanical/Electrical Noise During Operation: ☐ Yes ☐ No

Lubrication Required: ☐ Yes ☐ No

Cleanliness (As Found): ☐ Good ☐ Acceptable ☐ Poor

Unit Cleaned: ☐ Yes   Photograph Taken: ☐ Yes

Manual Control Test

Local/Remote Switch	Local Open/Close Switch	HMI Manual Command	PLC I/O					HMI / SCADA	Pass (P/F)
			DI Remote	DI Opened	DI Closed	DO Open	DO Close		
Local ☐ Not Applicable	Close	-							
	Open								
Remote	-	Close							
		Open							

Comments

Test Summary ☐ Test Passed ☐ Test Failed

Travel Time Test

Process Conditions

Travel	Time (sec)	Test Summary
Closed → Open		☐ Test Passed
Open → Closed		☐ Test Inconclusive - Further Investigation Required. ☐ Test Failed

Comments:

Final Analysis

		Comments:
Returned to Service:	☐ Yes ☐ No	
Monitoring / Further Inspection Required:	☐ Yes ☐ No	
Repair / Replacement Required:	☐ Yes ☐ No	

	Company	Name	Signature	Date (yyyy-mm-dd)
Performed By				
Checked By				

Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.