Installation Overview of View Smart Windows and Building Systems (Controls, Software and Services)

Responsibilities: Installation Scope of Each Trade

View responsibilities:

1. Shipment of IGUs, control system, programming and commissioning.

2. Assign a View Project Manager that will guide the project team successfully through the project from kickoff to closeout.

3. Provide all product documentation including IGU, roof sensor, control panel, window controller, and wiring datasheets.

4. Provide Preliminary Interconnect and Final Interconnect Drawings.

5. Provide training on proper installation of all View equipment and best practices.

6. Provide IGU and control system shipments on committed ship dates.

7. Mobilize Field Service Engineers (FSE) to perform final commissioning.

8. Mobilize Customer Success Manager (CSM) to work directly with end user during the construction phase and end phase to customize system and provide occupant training.

9. Provide a turnover package and operations training.

10. Provide warranty, support and service.

Glazing Contractor responsibilities:

1. Provide shop drawings of View Smart Glass locations as specified by the architect.

2. Provide the final IGU sizes and makeup, IGU cable lengths and routing in the glazing system, phased shipment schedule, and packaging needs.

3. Provide Mark IDs for all IGU sizes.

4. Approve location of Smart Window Connector and routing of IGU cables in glazing system as specified in View glazier integration drawings.

5. Provide safe and secure storage of View materials until building is ready for installation.

6. IGU installation in facade with IGU cable stubbed out to agreed upon accessible location for easy hand-off to the low-voltage contractor or electricial contractor (Do not deviate from drawings without approval from View PM).

7. Label all IGU cables per View interconnect drawing. Glazier is responsible for testing each IGU during fabrication process using the GTT (glazier test tool), provided by View. Follow testing protocols found in the Glazier Quick Start Guide on View's website.

8. Label each IGU cable with green "TESTED" label (green "TESTED" labels provided by View).

9. Provide glazier support during View functional hardware testing and commissioning phase.

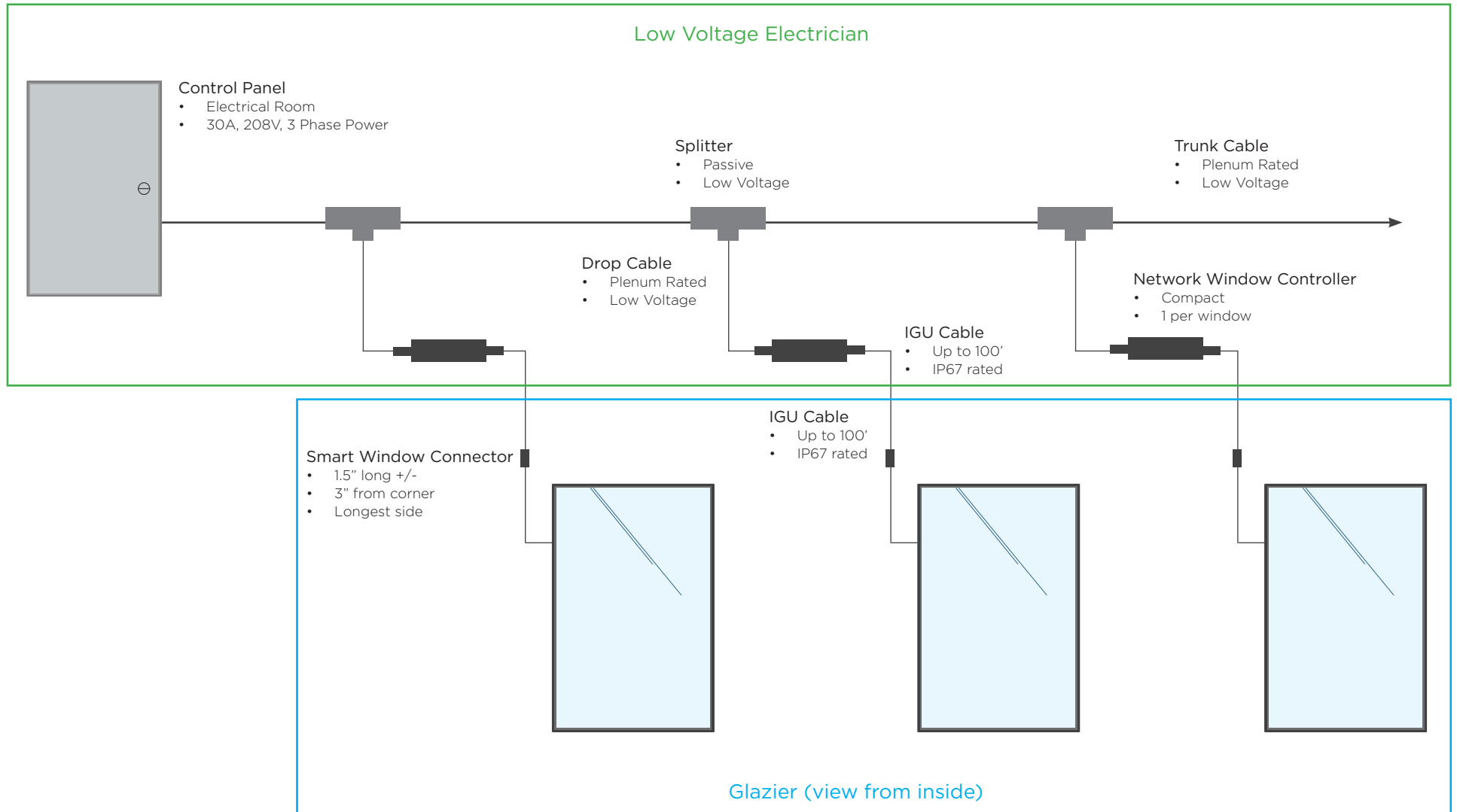10. Do NOT field splice IGU cables or Smart Window Connectors.

Low-Voltage Electrician responsibilities:

1. Based on View's design guidelines and data sheets, assist View with defining locations and routing of View control system including:

   - Control panels
   - Trunk cables
   - Power Insert cables
   - Splitters
   - Drop cables
   - Window controllers
   - IGU cables
   - Sky Sensor
   - Network connection cables

2. Provide final lengths of all cabling based on View's Preliminary Interconnect Drawing that will result in the Bill of Materials (BOM).

3. Define any phased delivery requirements based on the construction schedule.

4. Take delivery and provide safe and secure storage of View materials until building is ready for installation.

5. Provide location to conduct View 4 hour training at local Electrical shop with installation team 1-2 weeks prior to start on actual controls installation.

6. Installation of following per View interconnect drawings. Installers shall also follow Bicsi ITSIMM 7th Edition for standards or equivalent. Do no deviate from drawings without approval from View PM.:

   - Control panels
   - Trunk cables
   - Power Insert cables
   - Splitters
   - Drop cables
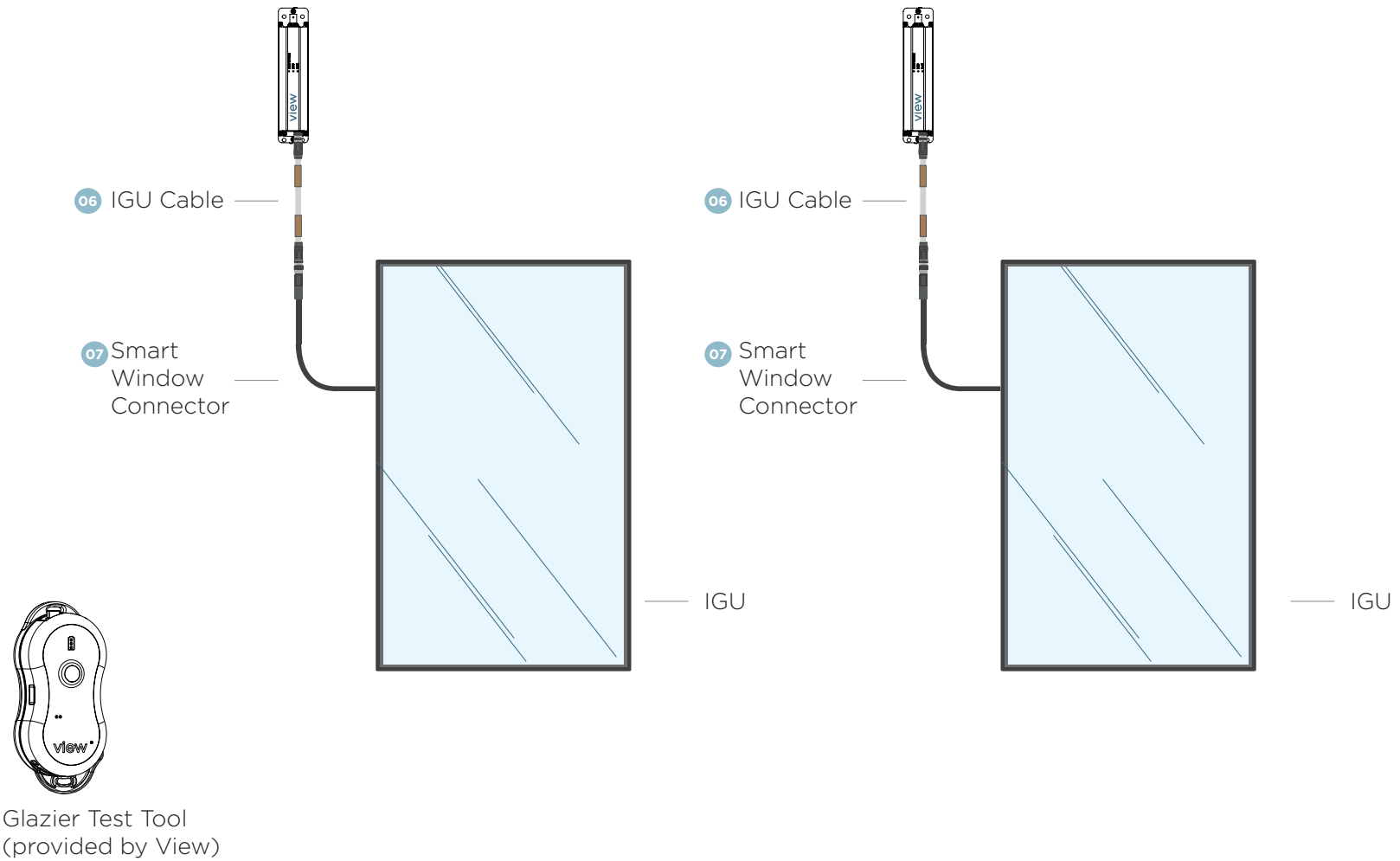   - Window controllers
   - IGU cables

- Sky Sensor
- Network connection cables
- Cell modem

7. All building penetrations, coring, raceways and sleeves necessary to accommodate View control cables. This work should be coordinated with glazing contractor and GC in accordance with local building codes.

8. If IGU cable needs to be extended, Low-Voltage or Electrical contractor shall test and label all IGUs using GTT (glazier test tool), see GTT guide for labeling protocol.

9. Labeling all trunk lines, power insert lines and IGU cables per View interconnect drawing.

10. Perform all Functional Hardware Testing prior to deployment of View FSE (Field Service Engineer).

11. Provide field support as needed during commissioning phase including, repairing items identified by the View FSE during commissioning phase. Any billable hours for troubleshooting should be coordinated with the General Contractor (GC).

12. Keep track of all cable and equipment changes including lengths, locations and cable pathways. Provide accurate redline drawings to View Project Manager at completion of project.

13. Electrician to provide stable power prior to functional hardware testing and commissioning.

14. All network cabling and connections between View equipment and customer network. If distance between View control panels exceeds 100-meters, fiber is required (i.e. control panels and sky sensor).

15. Some Union projects require the Low-Voltage contractor to install the IGU cables in the glazing system, check with the View project manager prior to bidding.

16. Do NOT field splice IGU cables or Smart Window Connectors.

Scope of Work: Division Specifications

- Division 8: Dynamic Glazing
- Division 25, 26, 27: Controls for Smart Windows

Low Voltage Electrician

Control Panel
- Electrical Room
- 30A, 208V, 3 Phase Power

Splitter
- Passive
- Low Voltage

Trunk Cable
- Plenum Rated
- Low Voltage

Drop Cable
- Plenum Rated
- Low Voltage

Network Window Controller
- Compact
- 1 per window

IGU Cable
- Up to 100'
- IP67 rated

IGU Cable
- Up to 100'
- IP67 rated

Smart Window Connector
- 1.5" long +/-
- 3" from corner
- Longest side

Glazier (view from inside)

Basic components for Glaziers

06 IGU Cable

07 Smart Window Connector

06 IGU Cable

07 Smart Window Connector

IGU

IGU

Glazier Test Tool
(provided by View)

Glazier Resources

Click here for training resources
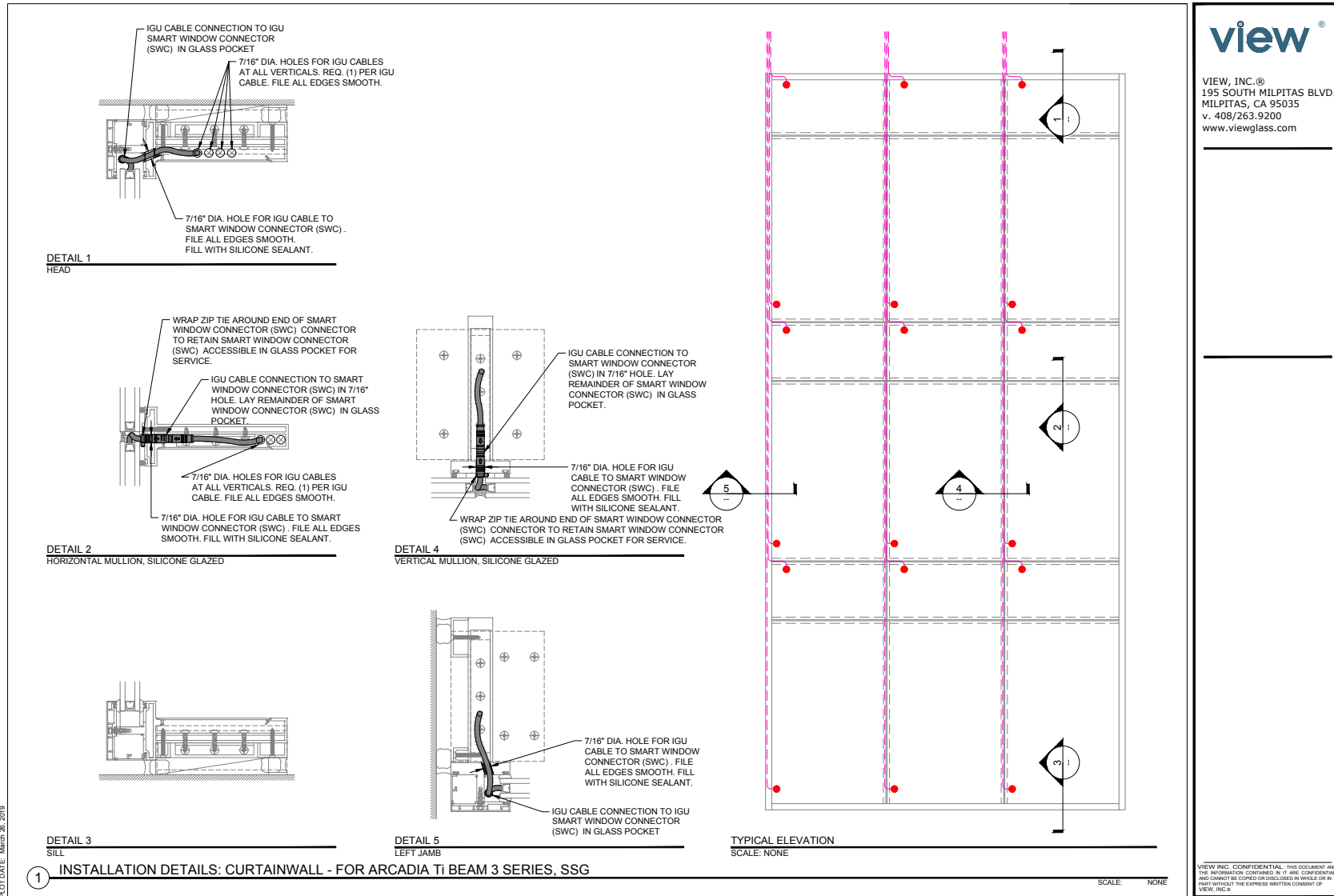
https://view.com/training/glaziers

Glazing Installation Labor Estimate Example

Below is a table showing an example IGU quantity for a 10,000 SF (glass area) building. Also shown are the expected additional installation labor minutes per IGU and extended total labor hours accounting for the total number of IGUs. This additional installation time is related to the glazier preparing the IGU frames by drilling holes, deburring hole edges, inserting silicone grommets, and sealing penetrations with silicone as needed to route IGU cable per View interconnect drawings. Glazier is also responsible for labeling IGU cables per View interconnect drawing. In this example, we are using $100.00/hour for the labor rate. We suggest using local market labor rates for this project.

For this example, the IGU and Smart Window Connector are shown in the chart below. The IGU Smart Window Connector will be connected to the IGU cable by the glazing contractor and needs to be made accessible for the LV Electrician.

DEVICE/ITEM	QTY	LABOR MINUTES PER DEVICE	ESTIMATED TOTAL LABOR HOURS	LABOR RATE	TOTAL
IGU	500	45	375	$100.00	$37,500.00

View Integration Drawings (example):

DETAIL 1
HEAD

IGU CABLE CONNECTION TO IGU SMART WINDOW CONNECTOR (SWC) IN GLASS POCKET

7/16" DIA. HOLES FOR IGU CABLES AT ALL VERTICALS. REQ. (1) PER IGU CABLE. FILE ALL EDGES SMOOTH.

7/16" DIA. HOLE FOR IGU CABLE TO SMART WINDOW CONNECTOR (SWC) . FILE ALL EDGES SMOOTH. FILL WITH SILICONE SEALANT.

DETAIL 2
HORIZONTAL MULLION, SILICONE GLAZED

WRAP ZIP TIE AROUND END OF SMART WINDOW CONNECTOR (SWC) CONNECTOR TO RETAIN SMART WINDOW CONNECTOR (SWC) ACCESSIBLE IN GLASS POCKET FOR SERVICE.

IGU CABLE CONNECTION TO SMART WINDOW CONNECTOR (SWC) IN 7/16" HOLE. LAY REMAINDER OF SMART WINDOW CONNECTOR (SWC) IN GLASS POCKET.

7/16" DIA. HOLES FOR IGU CABLES AT ALL VERTICALS. REQ. (1) PER IGU CABLE. FILE ALL EDGES SMOOTH.

7/16" DIA. HOLE FOR IGU CABLE TO SMART WINDOW CONNECTOR (SWC) . FILE ALL EDGES SMOOTH. FILL WITH SILICONE SEALANT.

DETAIL 4
VERTICAL MULLION, SILICONE GLAZED

IGU CABLE CONNECTION TO SMART WINDOW CONNECTOR (SWC) IN 7/16" HOLE. LAY REMAINDER OF SMART WINDOW CONNECTOR (SWC) IN GLASS POCKET.

7/16" DIA. HOLE FOR IGU CABLE TO SMART WINDOW CONNECTOR (SWC) . FILE ALL EDGES SMOOTH. FILL WITH SILICONE SEALANT.

WRAP ZIP TIE AROUND END OF SMART WINDOW CONNECTOR (SWC) CONNECTOR TO RETAIN SMART WINDOW CONNECTOR (SWC) ACCESSIBLE IN GLASS POCKET FOR SERVICE.

DETAIL 3
SILL

DETAIL 5
LEFT JAMB

7/16" DIA. HOLE FOR IGU CABLE TO SMART WINDOW CONNECTOR (SWC) . FILE ALL EDGES SMOOTH. FILL WITH SILICONE SEALANT.

IGU CABLE CONNECTION TO IGU SMART WINDOW CONNECTOR (SWC) IN GLASS POCKET

TYPICAL ELEVATION
SCALE: NONE

1 INSTALLATION DETAILS: CURTAINWALL - FOR ARCADIA Ti BEAM 3 SERIES, SSG

SCALE: NONE

PLOT DATE: March 26, 2019

view®

VIEW, INC.®
195 SOUTH MILPITAS BLVD.
MILPITAS, CA 95035
v. 408/263.9200
www.viewglass.com

Low Voltage Electrician Resources

Click here for training resources

https://view.com/training/lve-view-net

View Net Controls Overview (Base Package)

08 Sky Sensor

12 Pull Box

11 Cell Modem Assembly

09 Fiber Optic Connection

Network Uplink 10

Input Power 208V, 3 Phase, 30A

view

01 Control Panel

09 Fiber Optic Connection

03 Splitter

02 Trunk Cable

Drop Cable 04

Network Window Controller 05

06 IGU Cable

07 Smart Window Connector

IGU

03 Splitter

02 Trunk Cable

Drop Cable 04

Network Window Controller 05

06 IGU Cable

07 Smart Window Connector

IGU

03 Splitter

02 Trunk Cable

Drop Cable 04

Network Window Controller 05

06 IGU Cable

07 Smart Window Connector

IGU

Basic Control System Components Descriptions

Cabling System

The View cabling system uses a trunk line/drop line network topology. In this topology, the trunk cable carries both power and data through the entire length of the installation. Drop cables are then tapped off of the trunk cable using splitters at locations where network window controllers are installed. The network window controllers are then connected to individual IGU units via an IGU cable. Note: Component data sheets will supersede the information found here.

01 Control Panel

Wall-mounted enclosure (72" x 30" x 9") that contains the power supplies, floor controller, as well as auxiliary connections such as Ethernet and external sensors. At least one control panel is required for each installation. Each control panel can support up to 288 window controllers. Actual limits may vary depending on specific project considerations. For larger or multi-floor installations, multiple control panels may be required. Each Control Panel requires a dedicated 30-amp circuit (30-amp@208 VAC 3 phase).

Specifications for Control Panel:
- Input: AC 208V + 15%
- Frequency: 50-60 Hz + 6%
- Output Class: 2 48 VDC

02 Trunk Cable

Provides power and data to the window controller. Short cables come pre-terminated. Bulk spool cables must be terminated manually. Cables require male BNC connectors. Standard coax crimp tool required for termination.

Specifications for Trunk Cabling:
- Max combined length approx. 1,000'
- Available in lengths 1', 5', 6' or 500', 1000' spools
- Available in standard and plenum rated cables

03 Splitters

Used to connect drop cables to the trunk cable. Splitters come in WYE configuration.

04 Drop Cable

Provides power and data to the window controller. Ties into the trunk cable via the splitter. Short cables come pre-terminated. Bulk spool cables must be terminated manually. Cables require male BNC connectors. Standard coax crimp tool required for termination.

Specifications for Drop Cabling:
- Available in lengths 1', 5', 6' or 500', 1000' spools
- Available in standard and plenum rated cables

05 Network Window Controller

Facilitates power transmission to each IGU. Connected to a drop cable on one end and an IGU cable on the other end. Must be installed at an accessible, environmentally controlled location. One network window controller is installed per IGU. Includes one POE port via an IX connector.

Specifications for Window Controllers:
- Input: 48 VDC
- IGU Output: Range between + 5 VDC
- Dimensions: 1" x 1.47" x 5.63"
- POE Output: 48V, 7W

06 IGU Cable

Connects a network window controller to the IGU Smart Window Connector cable.

Specifications for IGU Cabling:
- Standard Tinting: Available in lengths from 1' to 100' (meter or fractional meter increments)
- Fast Tinting: Available in lengths from 1' to 50'
- Available in standard and plenum rated cables
- Max combined length from the WC to the IGU is 100'

07 IGU Smart Window Connector

Each IGU receives power from the control system through an IGU Smart Window Connector. The Smart Window Connector is embedded with a digital ID that is unique to that IGU's dimensions and specifications.

Specifications for IGU Smart Window Connector:
- ~15.5" +/- 1.5" length located 3" from corner. Location changes based on shape and dimensions. See IGU data sheet for exact location.
- Requires 7/16" hole size

08 Sky Sensor

Used to detect external light and infrared temperature levels. Data from the sensor is transmitted to the control panel for Intelligence. It is typically mounted on the roof top.

Specifications for Sky Sensor:
- Connects to View control panel via CAT5 cable.
- Mounts to rooftop, must be clear of obstructions, 360-degree view of the horizon, POE powered.

09 Fiber Optic Connection

For connection of multiple control panels on a site.

Specifications for Fiber Cables:
- Single Mode fiber
- Armored Cable with 96 strands
- Available in pre-terminated and field terminated lengths

10 Network Uplink

Contractor required to connect to customer network via ethernet or fiber (refer to View Interconnect drawing).
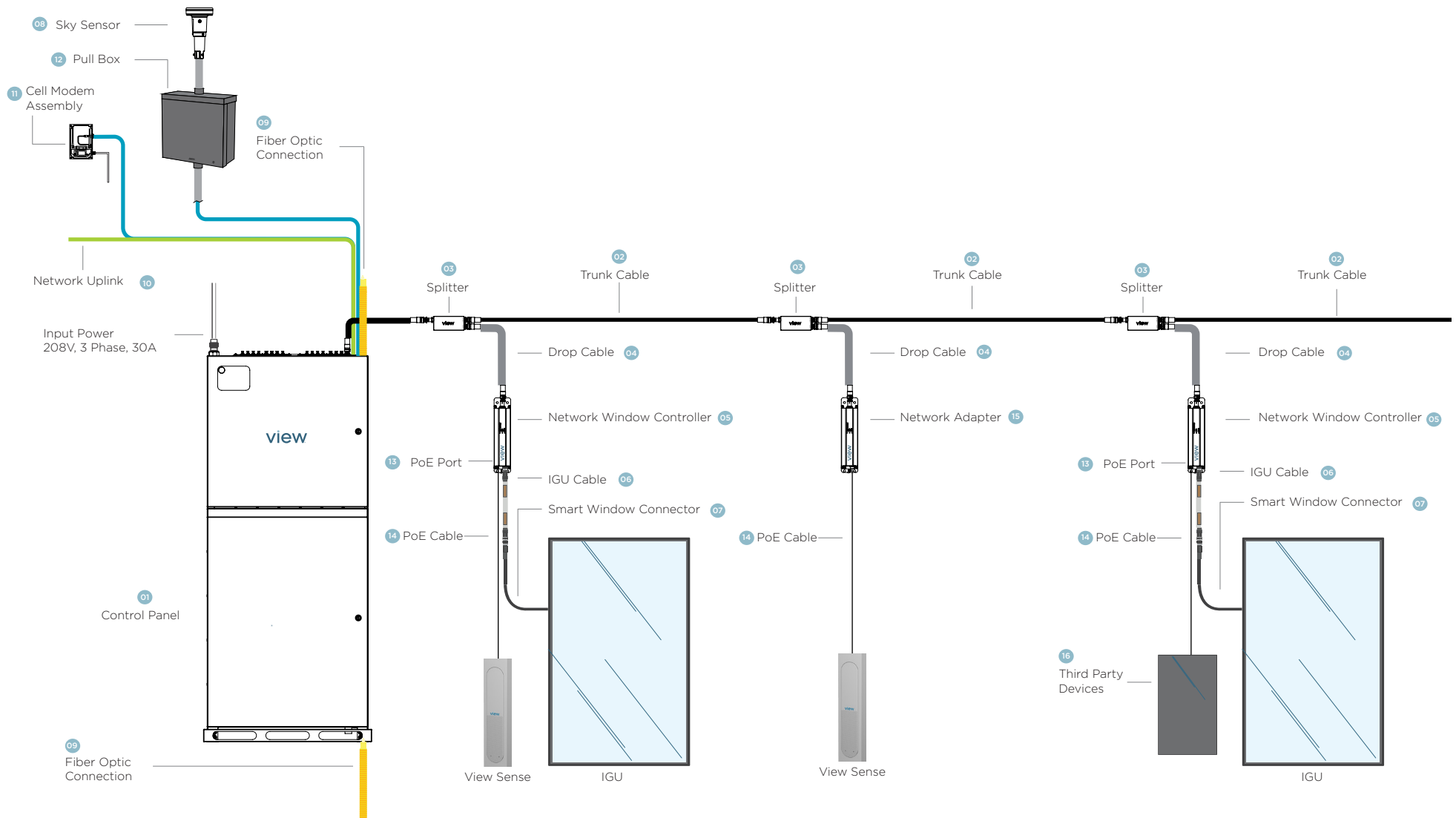
11 Cell Modem

Used as a temporary network connection to the View Site Ops monitoring system. Requires 110/120VAC 60Hz.

12 Pull Box

Used for storing extra ethernet cable to Sky Sensor.

View Net Controls Overview (IoT-Ready Package)

08 Sky Sensor

12 Pull Box

11 Cell Modem Assembly

09 Fiber Optic Connection

Network Uplink 10

Input Power 208V, 3 Phase, 30A

01 Control Panel

09 Fiber Optic Connection

03 Splitter

02 Trunk Cable

03 Splitter

02 Trunk Cable

03 Splitter

02 Trunk Cable

Drop Cable 04

Drop Cable 04

Drop Cable 04

Network Window Controller 05

Network Adapter 15

Network Window Controller 05

13 PoE Port

IGU Cable 06

13 PoE Port

IGU Cable 06

Smart Window Connector 07

Smart Window Connector 07

14 PoE Cable

14 PoE Cable

14 PoE Cable

16 Third Party Devices

View Sense

IGU

View Sense

IGU

Basic Control System Components Descriptions

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03 Splitters

Used to connect drop cables to the trunk cable. Splitters come in WYE configuration.

04 Drop Cable

Provides power and data to the window controller. Ties into the trunk cable via the splitter. Short cables come pre-terminated. Bulk spool cables must be terminated manually. Cables require male BNC connectors. Standard coax crimp tool required for termination.

Specifications for Drop Cabling:
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- Available in standard and plenum rated cables

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- Armored Cable with 96 strands
- Available in pre-terminated, field terminated lengths

10 Network Uplink

Contractor required to connect to customer network via ethernet or fiber (refer to View Interconnect drawing).

11 Cell Modem

Used as a temporary network connection to the View Site Ops monitoring system. Requires 110/120VAC 60Hz.

12 Pull Box

Used for storing extra ethernet cable to Sky Sensor.

13 PoE Port

Industrialized IX power over ethernet port that conforms to PoE standard 802.3af. Capable to supply data and power connectivity to any device within 100m using IX category 5e or better cable.

14 PoE Cable

IX Category 6 28 AWG cable for Power over Ethernet connectivity to the View Network Window Controller. Available in pre-terminated lengths from 1M to 10M.

15 Network Adapter

Provides ethernet connectivity to devices connected to IX Port.

Specifications for Network Adapters:
- Input: 48 VDC
- IGU Output: Range between + 5 VDC
- Dimensions: 1" x 1.47" x 5.63"
- POE Output: 48V, 15W

16 Third Party Devices

All third party devices must be compliant with PoE 802.3af and use less than 7W of peak power. Device power consumption must be confirmed with View prior to installation to ensure the devices does not exceed the coaxial cable power limit.
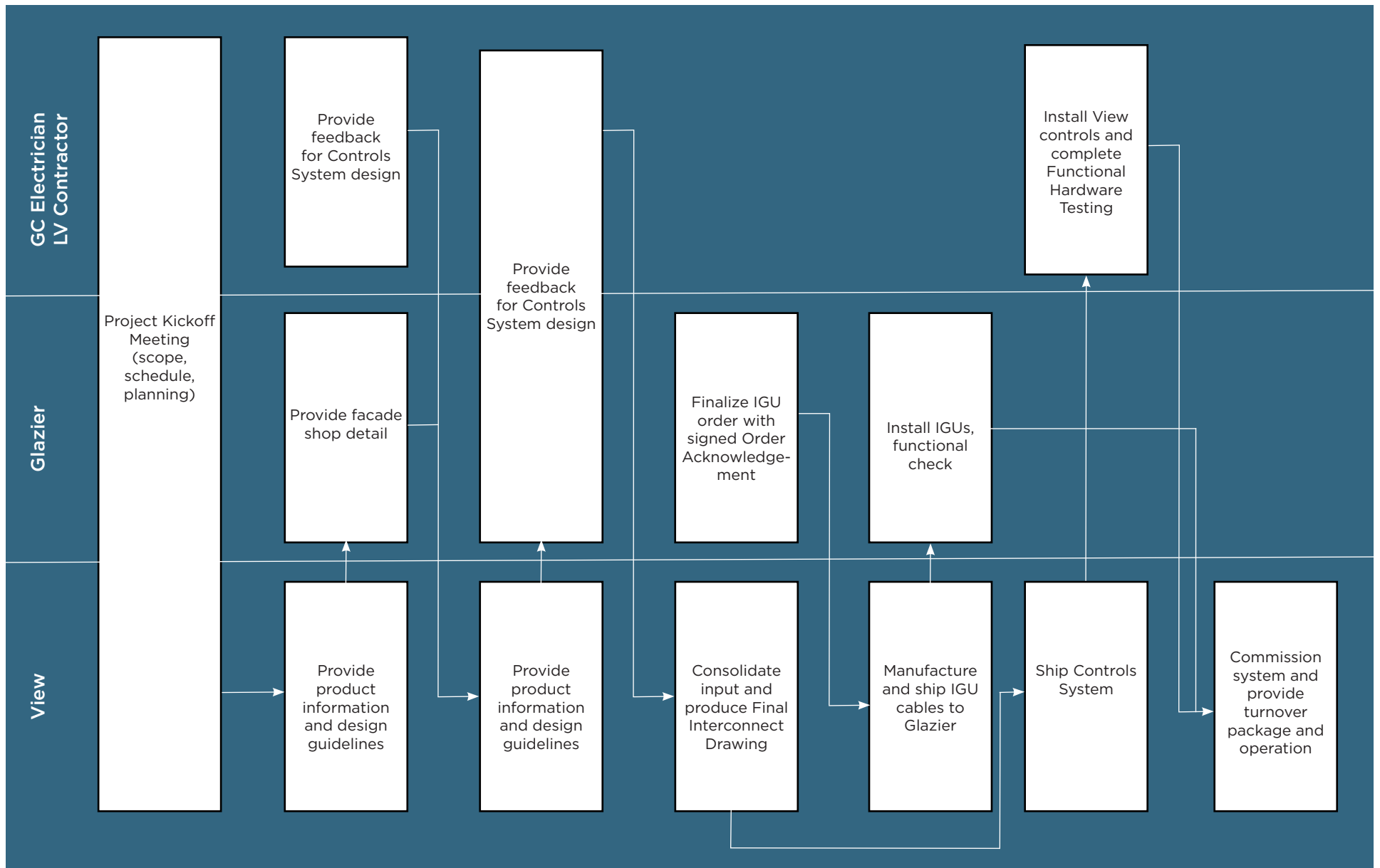
Interconnect Drawings

View provides comprehensive interconnect drawings for each project. Sample drawings available upon request.
Please contact LVEBootcamp@view.com for more information.

Data Sheets

Typically used Data Sheets are available on the View website.

Glass Implementation Process

GC Electrician LV Contractor		
Glazier		
View		

GC Electrician LV Contractor

- Provide feedback for Controls System design
- Provide feedback for Controls System design
- Install View controls and complete Functional Hardware Testing

Glazier

- Project Kickoff Meeting (scope, schedule, planning)
- Provide facade shop detail
- Finalize IGU order with signed Order Acknowledgement
- Install IGUs, functional check

View

- Provide product information and design guidelines
- Provide product information and design guidelines
- Consolidate input and produce Final Interconnect Drawing
- Manufacture and ship IGU cables to Glazier
- Ship Controls System
- Commission system and provide turnover package and operation

Glazier Test Tool (GTT)

The View Glazier Test Tool (GTT) is a portable convenient way to test View IGU, IGU pigtail and cable operation. In a 30-60 second test, the GTT will indicate whether the windows, pigtails, and cables are connected and operating properly. This device should be used on all View installations.
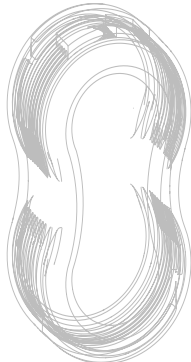
This device is designed for use by Glaziers, Low-Voltage Electricians and View FSE's who install and test View Smart Windows.
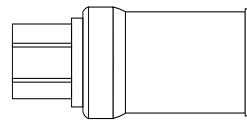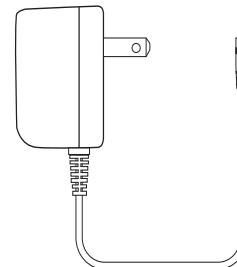

What's Included:
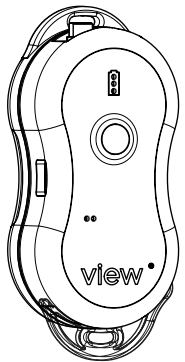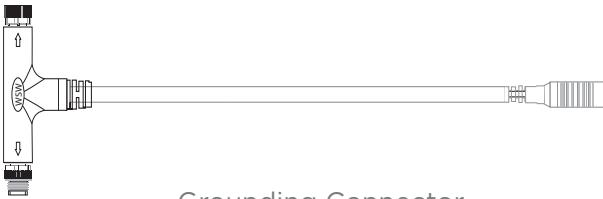

Glazier Test Tool
010-101781

Silicon Cover
020-101673

Pigtail Caps (x10)
370-101509

DC Charger
750-101502

Grounding Connector
370-101516

Alligator Clip Cable
380-101558