IT/IoT Applications
for V-LINE® & eV-LINE® Injection Moulding Machines

Quality & Production
Total Management System

V Connect

Machine to Machine
Communication Function

M2M
Machine to Machine

Data Management Tool
for Resin in Mould

SSM
Sodick Scientific Moulding

Sodick-IoT

EUROMAP Standard Compliant

IF for MES

Real time visualization of moulding sites!

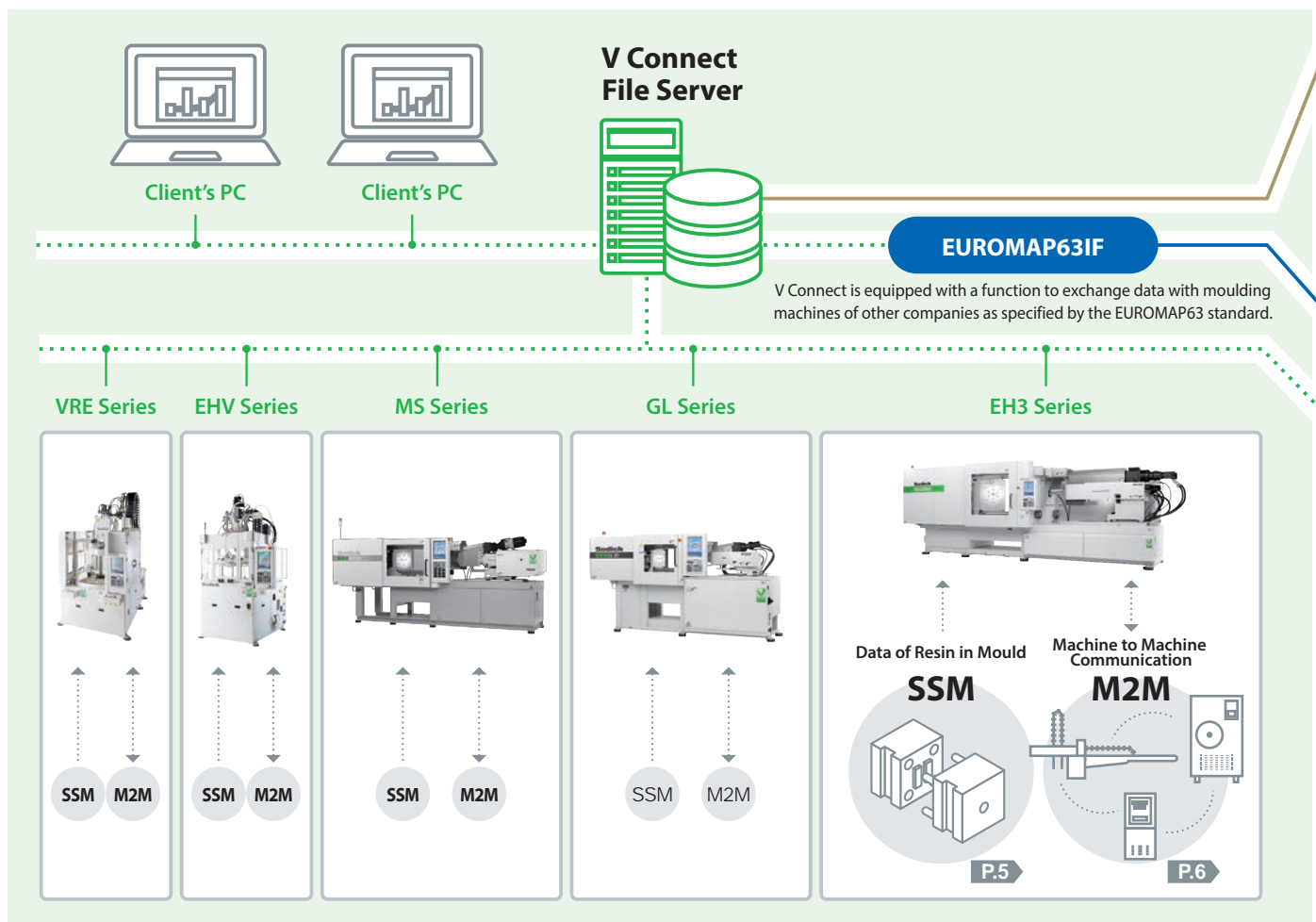## Sodick's IT/IoT[*1] applications contribute to smartification of moulding sites.

- **Traceability**.. Enables confirmation and tracking of the production history of moulded products, which improves quality stability.

- **Preventive Maintenance**.......... Realization of maintenance activities by finding failures / signs of defects of injection moulding machines, moulds, and incidental equipment

- **Productivity improvement**... Improvement in operation efficiency by objectively understanding the conditions that do not contribute to production, such as suspension and setup

Concept Map

Visualization of Overall System on Moulding Sites

V Connect Optional Product P.3 - P.4

Various moulding data can be acquired by connecting the "V Connect" file server and several injection moulding machines online. What is happening on moulding sites can be understood quickly by checking the client's PC, which contributes to improvement in production efficiency and quality.
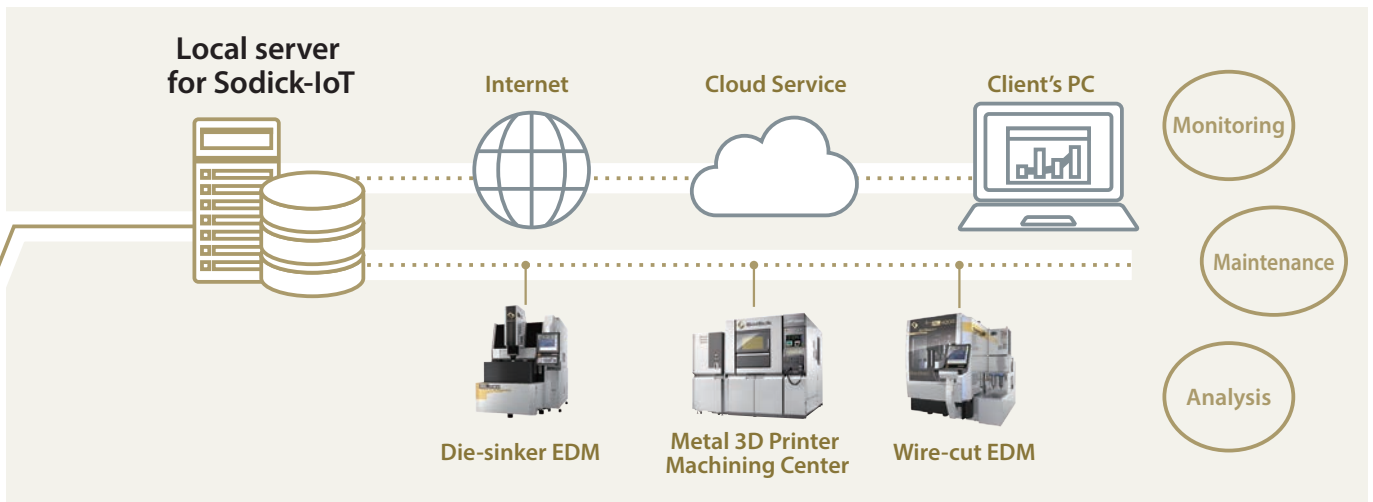
V Connect File Server

Client's PC

Client's PC

EUROMAP63IF

V Connect is equipped with a function to exchange data with moulding machines of other companies as specified by the EUROMAP63 standard.

VRE Series	EHV Series	MS Series	GL Series	EH3 Series
SSM M2M	SSM M2M	SSM M2M	SSM M2M	

Data of Resin in Mould
SSM

Machine to Machine Communication
M2M

P.5

P.6

※1：IT（= Information Technology）、IoT（= Internet of Things）

Sodick's Products
Sodick-IoT (To be released in October 2021)

Sodick promptly responded to Internet technology, and promoted the connection of several machines to a network environment and utilization of various acquired information and data.

Sodick-IoT performs central management of the operating information of Sodick products using the cloud environment, and provides information as follows. 1. Monitoring, 2. Maintenance, and 3. Analysis

Local server for Sodick-IoT — **Internet** — **Cloud Service** — **Client's PC** — Monitoring — Maintenance — Analysis

Die-sinker EDM | **Metal 3D Printer Machining Center** | **Wire-cut EDM**

> Central Management of Moulding Information for
Other Manufacturers as well

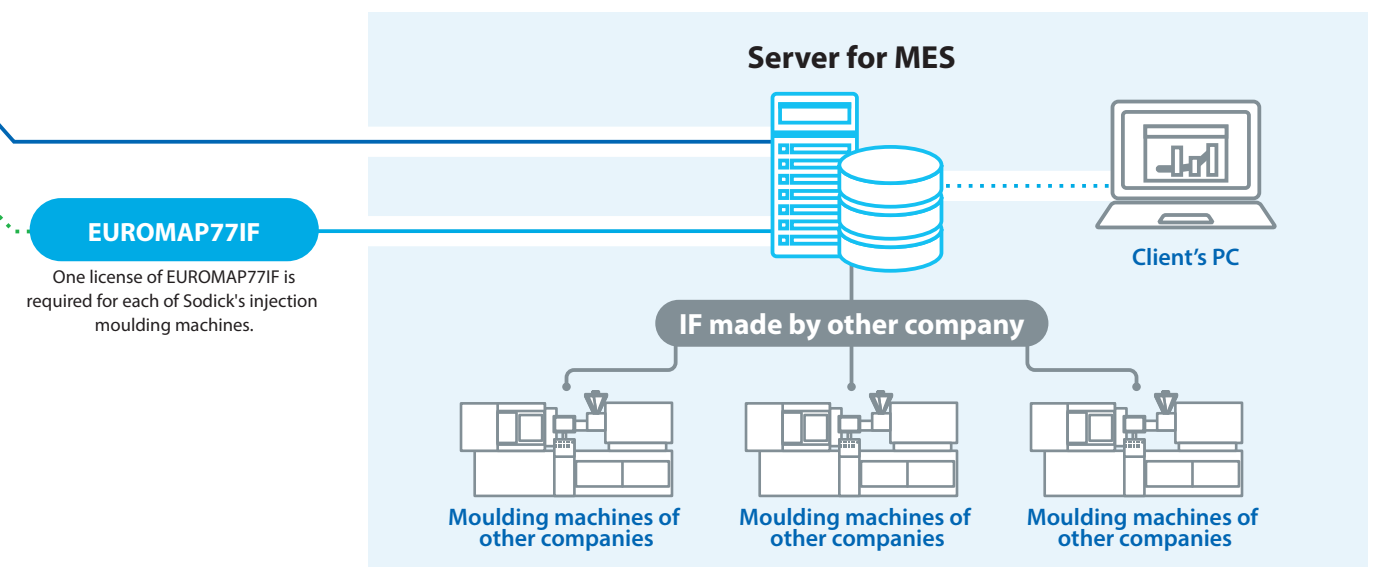# EUROMAP Standard Compliant IF for MES *2
(EUROMAP63IF/EUROMAP77IF) Optional Product

Most of the plastic processing manufacturers use several injection moulding machines made by different manufacturers for production.

The "EUROMAP63/77 Standards" specify the integration of data which is to share data formats and names that differ by manufacturer, and automatically collects the common data from different injection moulding machines.

Sodick provides the interface (IF) based on each standard as follows.

EUROMAP63IF: Some functions of "V Connect (Optional product)," EUROMAP77IF: Optional product

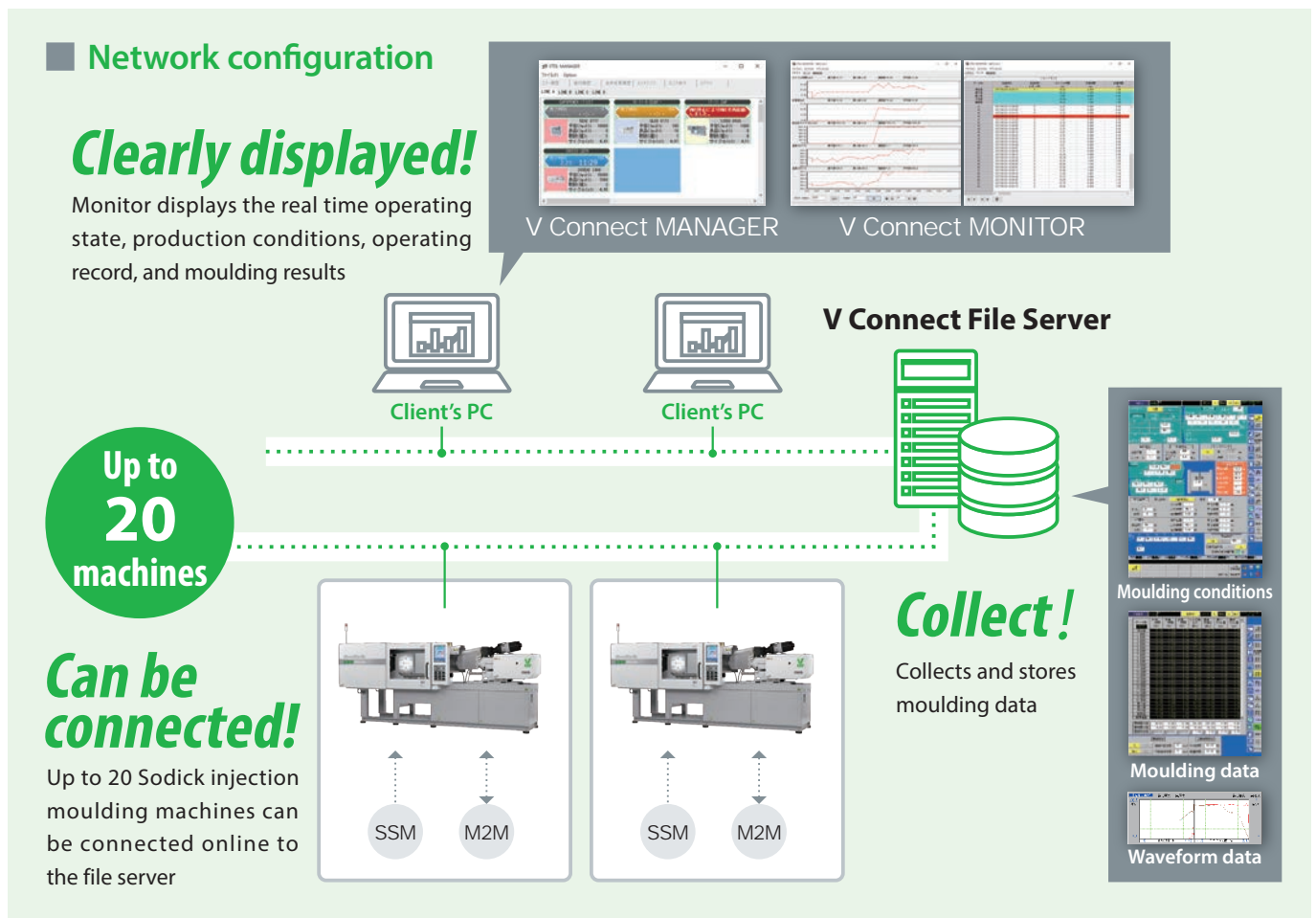The IF differs depending on the MES to be used. Please contact Sodick in advance.

Server for MES

Client's PC

EUROMAP77IF

One license of EUROMAP77IF is required for each of Sodick's injection moulding machines.

IF made by other company

Moulding machines of other companies | **Moulding machines of other companies** | **Moulding machines of other companies**

*2: MES (Manufacturing Execution System), IF (Interface)

V Connect

Central Management of Overall Moulding System Data on Moulding Sites

This is the main application of the IT/IoT system for Sodick's injection moulding machines. Various moulding data can be acquired by connecting the "V Connect" file server and several injection moulding machines online, which can be confirmed on the client's PC.

■ Network configuration

Clearly displayed!

Monitor displays the real time operating state, production conditions, operating record, and moulding results

V Connect MANAGER **V Connect MONITOR**

V Connect File Server

Client's PC Client's PC

Up to 20 machines

Can be connected!

Up to 20 Sodick injection moulding machines can be connected online to the file server

SSM M2M SSM M2M

Collect!

Collects and stores moulding data

Moulding conditions

Moulding data

Waveform data

Data to be Collected and Stored

Moulding conditions
Each set value of the moulding machine operation

☐ Injection & plasticization ☐ Mould open/close & clamping
☐ Extrusion ☐ Heater temperature, etc.

Waveform data
Shot axis waveform of speed and pressure, and time axis waveform

Log data
Various logs including errors, operation and changes of conditions

Process monitoring
Actual moulding data for process monitoring item

Time	Pressure	Position
☐ Cycle	☐ VP switching	☐ Min. cushion amount
☐ Filling	☐ Max. filling	☐ Max. cushion amount
☐ Measurement, etc.	pressure, etc.	etc.

V Connect Recommended Operating Environment

* Please contact a sales representative for details on the recommended environment.

■ OS ....Windows 10 Professional, Windows Server 2016
■ CPU.......................................Core i5 (2.0GHz) or later
■ RAM.....................................8GB or more
■ VGA..1024×768 pixels or more display area
■ HDD.......................................500GB or more
■ Communication port ...LAN (1000 BASE-T supported)

■ Power supply for moulding machines............. IM4, IMC7, IMC6, TRD6
■ Max No. of moulding machines for control ... 20
■ Shot data 1,000 shots... about 510 KB
■ Waveform file .... about 100 KB
■ Conditions file... about 40 KB
■ Log data 1,000 .... about 100 KB

V Connect MANAGER

■ Production Status Main Screen

- ☐ Operating status
- ☐ Maintenance period
- ☐ Moulding conditions name
- ☐ Model & machine name
- ☐ No. of mouldings scheduled
- ☐ Total No. of good products
- ☐ No. of cavities
- ☐ Cycle time
- ☐ Estimated production completion time
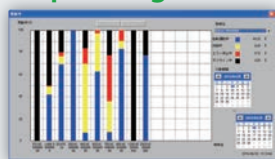
Indicates operating status in color

Blue: In production
Red: Error stop
Yellow: Standby
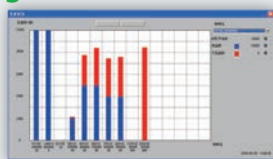Black: Offline

Notifies the maintenance period in color

Blue: Expiration period less than 75%
Yellow: Expiration period 75% or more and less than 100%
Red: After period expired

Production status & operating ratio management

Operating ratio

Production status

Log management
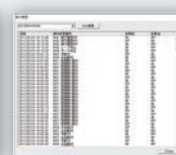
Error log   Operation log   Moulding conditions change
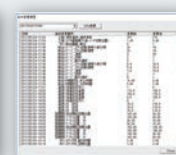
V Connect MONITOR

■ Monitors stored moulding data

X Graph

Moulding data monitor
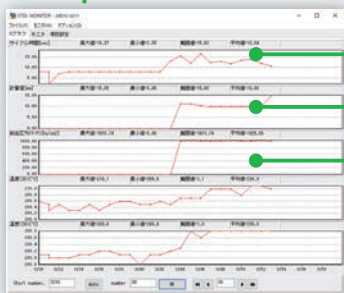
- Statistical value display (Max., Min., Ave., Range)
- Displays moulding data in real time
- Displays waveform & moulding conditions by selecting the point and data No.
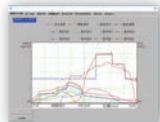
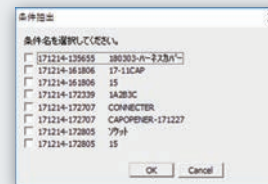Waveform (Velocity - pressure)   Moulding conditions
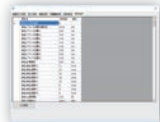
■ Extracts stored moulding data

When multiple items are moulded by one injection moulding machine, the moulding data of specific moulded products can be extracted.

Period selection extraction

Conditions selection extraction

Even Easier to use New Functions

CC unit supported

Registering the plunger diameter of each moulding machine displays the X Graph, Monitor, injection position of the waveform screen and injection speed data in the CC unit. Makes the shot volume more intelligible.

Date/time specified data extraction (Narrowed down)

Setting the start and end date and time displays the shot data of the period on the monitor and X Graph. (Maximum of 50,000 data)

Type specified data extraction (Narrowed down)

This is a type narrowing down function used when a large amount of shot data is acquired by the "Date/time specified data extraction" function. Selecting the type (moulding conditions) from the list enables extraction of any shot data.

Linking function between each log contents and type

Links each log (error, operation, conditions change and maintenance) and type or moulding conditions of the moulding machine for display. Effective for specifying the cause and solving moulding troubles, etc.

SSM Sodick Scientific Moulding

Optional product

Visualize the data of the resin in the mould for full utilization to further improve productivity!

The injection pressure and resin pressure in the mould by the V-LINE® without backflow of the injected resin has excellent correlation, which enables double-checking of the moulded product quality.

Actively proposes numericalization of the behavior of the resin in the mould to be used for various applications.

Setting of optimal moulding conditions	Automatic sorting of defective products
Quality control	Mould evaluation

Resin pressure in mould

Injection pressure
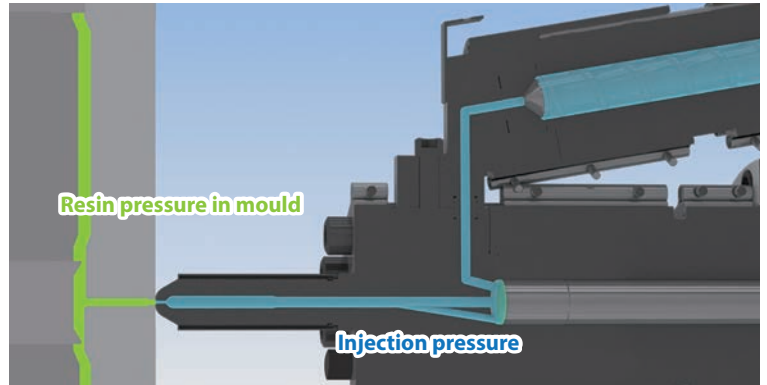
Example of Thin Lens Moulding

This is the result of overwriting the injection speed, pressure waveform, and mould internal pressure waveform of 50 shots in thin lens moulding.
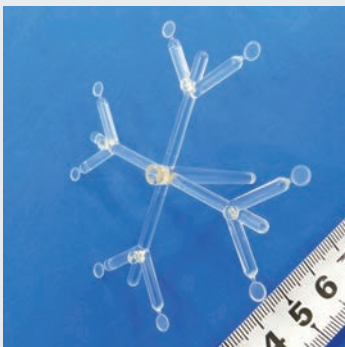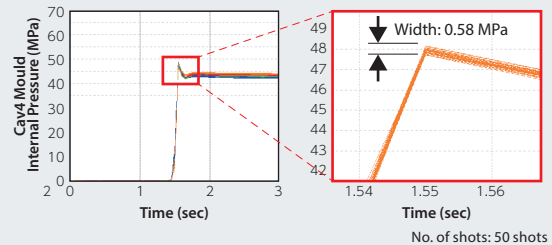
The repeatedly stable injection condition and mould internal pressure condition without variations can be confirmed.

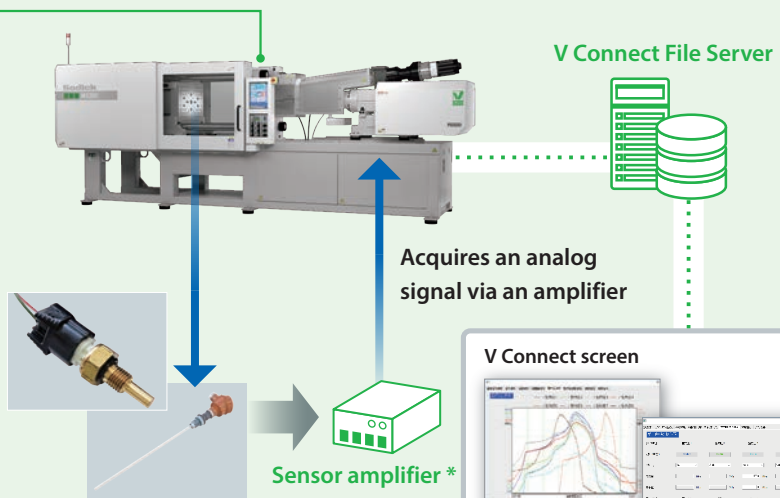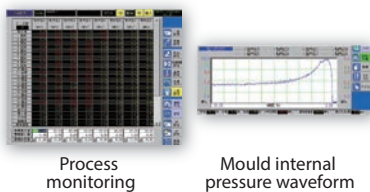### Stable Injection Pressure of V-LINE® Moulding Machine

No. of shots: 50 shots
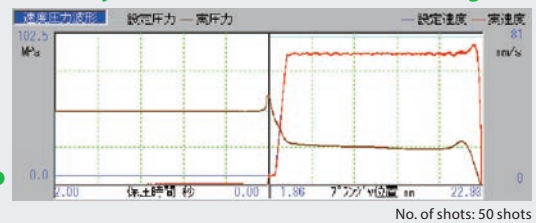
Stable Value (Waveform) is also realized for Mould Internal Pressure

Width: 0.58 MPa

Cav4 Mould Internal Pressure (MPa)

Time (sec)

No. of shots: 50 shots

■ System Configuration

Applications for Injection Moulding Machine 「SSM」※

The pressure and temperature of the resin in the mould are acquired as an analog input up to 8 channels. The process monitoring screen of the injection moulding machine can be confirmed, and the set alarm values and mould internal pressure waveform can be displayed.

Process monitoring

Mould internal pressure waveform

V Connect File Server

Acquires an analog signal via an amplifier

Sensor amplifier *

V Connect screen

Mould is equipped with a mould internal pressure sensor and temperature sensor *

Using V Connect in combination, enables Zoom In, Zoom Out, and overwriting of the mould internal pressure waveform.

*: "SSM" is an application of the injection moulding machine. Various sensors and amplifier are prepared by the customer.

M2M Machine to Machine
Optional product

Constructed a traceability system by integrating various data of the moulding system!

Sodick's injection moulding machine provides a function to perform mutual communication with peripheral equipment (devices) which constitutes the moulding system, such as the sprue picker and dryer.

The traceability system can be constructed by performing centralized and integrated management of the operating data of the moulding machine and peripheral equipment in the operation screen of the injection moulding machine.

| ON/OFF operation of peripheral equipment | Various settings | Monitoring of operating status |

Provides 2 Types of Functions

Since the communication content that can be used differs in the various peripheral equipment, Sodick provides 2 types of functions.

1 Data communication
Equipment capable of set data communication
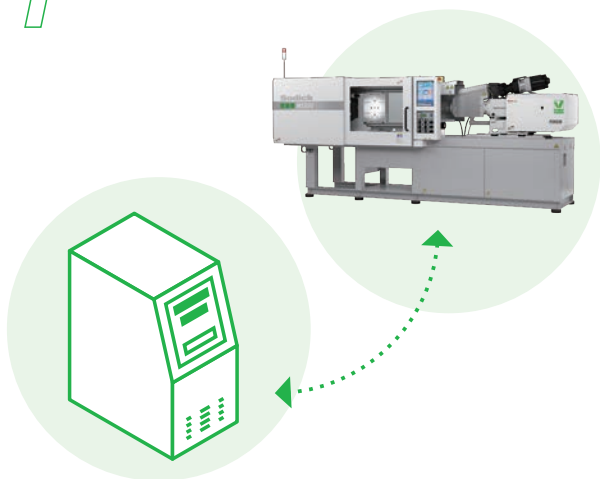
2 Remote operation
Equipment which displays the controller screen of equipment on the moulding machine, and remote operation is possible
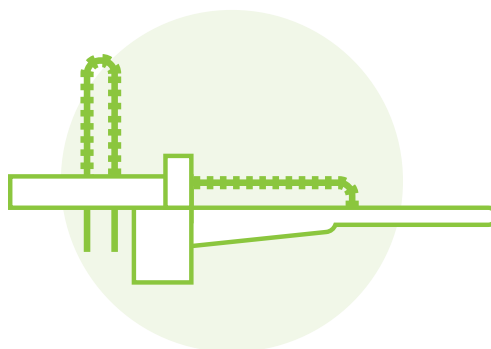
	1. Data Communication	2. Remote Operation
Typical equipment	Mould temperature controller, material dryer	Traverse robot, hot runners
Connection	Connected via serial cable Direct connection: 1 unit Equipment with relay function can communicate with up to 2 units	Communication via LAN cable Connection is possible with several equipment via a HUB relay
Communication port	RS-422/485 (Additional construction of terminal block is required)	LAN (Setting of device name of moulding machine, and IP address)
Equipment side data	Acquired by injection moulding machine	Display only, acquisition not possible
Advantage	Injection moulding machine side performs integrated management of the equipment conditions	If the equipment is supported, individual management is not required

*: Depending on the manufacturer / model, "data communication" and "remote operation" may not be available. Please contact Sodick in advance.

SSM

M2M

V-LINE® & eV-LINE® Injection Moulding Machine

V Connect

IT/IoT Applications for
V-LINE® & eV-LINE®
Injection Moulding Machine

EUROMAP Standard Compliant
IF for MES

Sodick-IoT

Moulding machines of other companies

Sodick products

Sodick Co., Ltd.