CONTROLOTRON

SYSTEM 1010

ADVANCED DESIGN ULTRASONIC FLOWMETER FAMILY

System 1010 ...
The most widely applicable of all flowmeters

System Description

System 1010 is the most comprehensive family of Non-Intrusive Ultrasonic Flowmeters ever developed. Among the various families of 1010 products, you will find an ultrasonic flowmeter particularly suitable for your liquid or gas flow application, and will usually outperform conventional intrusive Coriolis, Magmeter, Turbine or Vortex Flowmeters, even in their best application.
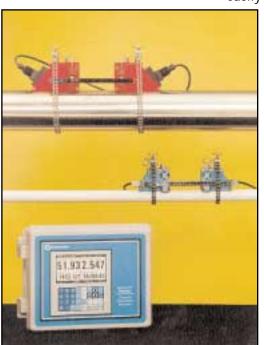
Choose from a wide variety of Portable and Dedicated Clamp-On Transit-Time models, or unique high performance non-intrusive InLine models. All models provide a choice of analog and digital data outputs and displays, and are easily field programmable to service any application requirement. Many models are available in Dual and/or Four Channel (or Multi-Path) operation for extraordinary economy and performance. And for those applications involving liquids of low sonic conductivity, Controlotron's award winning Fast Fourier Transform doppler technology is available in our built-in Reflexor option.

High Performance, Reliability, Accuracy and Low Maintenance

System 1010 provides extraordinary repeatability and calibration accuracy by using patented WideBeam™ transducers, which conform to the specific sonic waveguide characteristics of each pipe. Unlike "single transducer" designs Controlotron's WideBeam transducers enable inclusion of phase markers, in each sonic transmission, to assure that all data received meets the high signal integrity required for custody transfer accuracy performance.

1010 transducers never contact liquid, and do not corrode or wear, eliminating need for the expensive periodic recalibration required for conventional intrusive flowmeters. This results in extremely high reliability, greatly minimizing maintenance requirements. Many Controlotron flowmeters have been in continuous service for over 20 years without requiring service.

1010DN Dual Channel Flow Computer

Highly economical Dual Channel 1010DN reports flow in two different pipes simultaneously and even reports their sum or difference if desired. Featuring simple menu guided Site Setup and fast PinStop® transducer installation, System 1010 provides very accurate flowmetering for essentially any liquid on any pipe between 1/4 inch and 360 inches in diameter.

Lowest Cost of Ownership of Any Flowmeter

System 1010's low cost of ownership starts with low initial cost, especially in its MultiChannel configuration, measuring flow on up to four different pipes simultaneously, with no sacrifice in function or performance. Add to this 1010's minimal installation cost; no shutting down operation to install a conventional intrusive flowmeter, (or remove it for repair or calibration). And 1010's high reliability greatly reduces the normally high cost of flowmeter maintenance.

System 1010 flowmeters are widely applicable. Most users field program only one type of 1010 model for most of their applications. This eliminates the expense of maintaining many different types of intrusive flowmeters for the diverse application conditions most process operations require. To meter a new application, or quickly replace a failed intrusive flowmeter, merely program a stocked 1010 for the application's pipe size, without stopping flow even to remove the failed flowmeter.

The widest choice of models assures the right choice for your application

Select The Right 1010 Model For Your Applications

System 1010 offers a wide choice of different flowmeter families, collectively covering essentially every conceivable flowmeter application. Learn about each family, and select the one which is most suitable for your application's functional and performance requirements. A detailed brochure is available for each family, and data sheets are available to assist you in selecting the exact 1010 model you need. Portable 1010 models are available to measure flow quickly and accurately at locations not requiring continuous monitoring. Use a 1010 Portable to evaluate the operation and performance which a Dedicated 1010 will provide, prior to purchase, without cutting your pipe or stopping your process operation.

Better yet, request the 1010 Application Information Form, and let a Controlotron Application Specialist assist you in selecting the 1010 model which offers the best combination of high performance, function and at the lowest cost. All models provide high reliability and low maintenance, even under the harsh conditions frequently encountered in many process operations. Many models are available from stock, and can be shipped promptly after receipt of your order. Credit card orders are accepted.

There are seven System 1010 Non-Intrusive Ultrasonic Flowmeter Families from which to choose the model best suited to your application's functional and performance requirements, each including a variety of standard and stocked models:

System 1010P, 1010DP, 1010WP and 1010WDP Portable MultiFunction Flowmeters
⇒ Choice of Miniaturized or Submersible Construction
⇒ Available in Single or Dual Channel/ Dual Path Models
⇒ MultiFunction Options include:
- ◆ Clamp-On Transit-Time Flowmeter
- ◆ Clamp-On Reflexor Flowmeter
- ◆ InLine FlowTube Flowmeter
- ◆ InLine Clamp-On Spool Flowmeter
- ◆ Pipe Wall Thickness Gauge
- ◆ Pipe Wall Flaw and Condition Detector
- ◆ Liquid Type Identifier and Quality Analyzer
- ◆ Clamp-On RTD Temperature Measurement

System 1010N or 1010X Dedicated Flowmeters
⇒ Clamp-On Transit-Time plus optional Reflexor Technology
⇒ Choice of NEMA 4X (IP65) or NEMA 7 (EExd) Construction
⇒ Available in Single, Dual or Four Channel/Path Models

System 1010FT or 1010S InLine Volumetric or Mass Flowmeters
⇒ Choice of FlowTube or Clamp-On Spool Transit-Time Models
⇒ Available in NEMA 4X (IP65) or NEMA 7 (EExd) Construction
⇒ Available in Single (Separate or Integral), Dual or 4 Channel Models

System 1010E Clamp-On Thermal Energy Meters
⇒ Choice of Portable or NEMA 4X (IP65) Construction
⇒ Available in Single or Dual Channel/Dual Path Models

1010WDP Submersible Flow Computer with 1011P Clamp-On Transducers

Universal 1011P Transducers install quickly and accurately without spacing measurement using the 1012B Spacer Bar and 1012MR Mounting Chains. FastStart Installation, Help and Diagnostic Menus guide even novice installers to successful and accurate operation every time.

Large 1010WDP alphanumeric data display is visible from over 40 feet (12M) to permit Hands Free operation. And submersible flow computers and transducers, with up to 1000 feet (305M) cable length assure applicability under all site conditions.

Request System 1010 Pipeline Systems Brochure for details on 1010 Petroleum & Gas Flowmeter & Pipeline Management Systems.

System 1010 Technology...

Controlotron's 28 years of research and development provides the most advanced Transit-Time and Reflexor Ultrasonic Flowmetering Technology now available.

Transit-Time Technology

System 1010's patented Transit-Time technology provides the following significant advantages over any alternative system:

Wide Beam Transducers

Controlotron's patented Wide Beam transducers take advantage of the fact that all pipes are actually Sonic Waveguides, with a preferred operating frequency and other Sonic characteristics. They match each pipe to provide the ultimate in precision despite substantial changes in process liquid and environmental conditions. An unmatched Single Transducer system, used in some transit-time flowmeters, cannot equal Wide Beam performance and are adversely affected by both liquid and flowrate changes.

MultiPulse™ Transmission

System 1010 transmits dozens of pulses at each transmission for the ultimate in sensitivity and data density. This enables 1010 to provide excellent stability in fast acting automatic Flow Control Systems.

Phase Detection & Phase Marker Correlation

All System 1010 Transit-Time Flow Computers detect flow using Phase Detection, rather than Amplitude Detection. Phase Detection avoids the serious impact that liquid aeration and non-homogeneity have on signal amplitude, enabling 1010 to operate under process conditions which defeat ordinary transit-time flowmeters. 1010's Phase Coded Transmission permits receive signal Phase Correlation to assure that all signals are free of corruption from any source whatsoever, not possible in amplitude based detection systems.

AutoZero™

Since Clamp-On Flowmeters can be installed without stopping flow operations, AutoZero avoids the need to stop flow to accurately set the Zero flow calibration, regardless of the flow rate at the time of installation.

Help Menu

Most Installation Manuals never make it to the installation site. Not so with System 1010. All the help that is ever needed is available on the 1010 Graphics Display screen, by simply depressing the Help key on the 1010 keyboard.

FastStart Menu

Portable System 1010 users will enjoy the simple FastStart menu provided. This permits Site Setup and transducer installation by simply choosing your pipe size from a pre-registered list of pipes. All operating parameters are installed automatically, according to user editable defaults. Alternatively, access to the Full Installation menu permits customizing any aspect of operation as may be needed.

Remote PC Site Setup with FlowTalk

All System 1010 Flow Display Computers can be accessed remotely, via RS-232, to access its data output, Site Setup and Diagnostic data from anywhere in the world. Or change any operating parameter through the installation menu remotely. In addition, users can upload and download Site Setups from PC memory to assure that important data is never lost.

Our unique FlowTalk routine permits data to be quickly transferred to conventional PC spread sheet programs, enabling charts and graphs to be prepared quickly for staff analysis.

Huge MultiGraph Graphics Display

Controlotron's Graphic Display provides a variety of user selected Digital and Analog display options. Digital data is displayed in large 1 1/8″ (28.6 mm) characters, easily visible from as far away as 40′ (12 M). And 1010's analog displays make flow & liquid property trends instantly visible, to enable operating staff to see exactly how their process is going.

Diagnostic Menu

All System 1010 instruments are provided with a Diagnostic menu, which many consider invaluable in determining current process conditions. A variety of flow and liquid condition parameters are shown, in addition to a full array of numerical and graphic diagnostic screens which show how the 1010 is performing under current application conditions.

Huge DataLogger Memory

1010's Datalogger is user programmable to record any available data, at a wide variety of time intervals. In addition, 1010 can be set to record or alarm when any preset data limit or condition has been exceeded. This prevents the loss of transient events when using dataloggers which record only at preset intervals. A choice between a standard 200 Kbyte memory, sufficient to store many Site Setups and much data, and a 1 MegaByte Datalogger Memory option is available.

Reflexor Fast Fourier Transform Technology

For applications with liquids which are poor conductors of sonic energy, due to extreme aeration or solids content, Controlotron's unique Reflexor technology is optionally available in most models. Reflexor is an advanced Doppler technology, based on Controlotron's award winning Spectra Fast Fourier Transform System. In Dual Channel 1010 Systems, it is permissible to operate one channel as a Reflexor, while the other operates simultaneously in Transit-Time mode.

Fast Fourier Transform breaks the reflected sonic signals into individual frequency components, enabling 1010 to discriminate against noise signals & other factors which cause significant flowrate error in ordinary doppler devices. And, Reflexor has the ability to indicate whether the signal tends to come from near the pipe wall, or from the center of the pipe, to correct for flow profile effects, for highest possible accuracy.

Thickness Gauge Technology

Portable System 1010 Flowmeters are equipped with an optional Thickness Gauge capability, allowing users to confirm the wall thickness of their pipes at the time of installation. This assures the best possible accuracy in applications where the pipe wall thickness is not known.

System 1010's Thickness Gauge automatically displays wall thickness for any type of pipe material. In addition, its Graphic Display shows the sonic reflection pattern on its screen enabling the operator to assure best accuracy.

Pipe Flaw and Condition Detector

When installing a Clamp-On Transit-Time Flowmeter, it is desired that the transducers be located on a section of pipe relatively free from flaws or internal deposits. The Portable System 1010 Pipe Flaw and Condition Detector shows the presence of internal pipewall flaws or deposits on its Graphics Display Screen. While not intended to be a pipe wall integrity detector this facility helps to assure accurate flowmeter operation.

System 1010's clamp-on battery operated Portable MultiFunction Family

The Portable 1010 Family includes both Single and Dual Channel/Dual Path Volumetric or Mass Flowmeters in your choice of Miniature or WeatherProof models.

MultiTasking 1010 lets you choose any MultiFunction operation you need at any site you visit:

⇒ Transit-Time Flowmeter
- ◆ Universal and WideBeam Clamp-On Transducer Operation
- ◆ InLine FlowTube Operation
- ◆ High Precision WideBeam Clamp-On Spool Operation

⇒ Reflexor™ Fast Fourier Transform Flowmeter
⇒ Digitized Clamp-On RTD Thermal Energy Flowmeter
⇒ Clamp-On Wall Thickness Gauge
⇒ Clamp-On Pipe Wall Flaw Detector
⇒ Clamp-On Liquid Type and Quality Analyzer

Fast Simple System 1010 Installation

Install transducers and startup operation in only minutes using 1010's FastStart Site Setup Menu. Dynamic Help Menu answers any question by simply pressing the Help key. Store up to 100 Site Setups, or transfer stored setups from your remote PC via RS-232 by phone modem.

Dual Channel System 1010DP Miniature Portable MultiFunction Flowmeter

Miniature Portable 1010DP is easy to carry and operate even without removing it from its convenient CarryCase. It lets you use Clamp-On or InLine flowmeter technology, as may be required for any application you may encounter. Its large 1 1/8 inch (28.6 mm) backlit data display is visible from as far as 40 feet (12 M), for HandsFree operation. Both channels can operate simultaneously on different size pipes, flowing different liquids at different rates, in either Transit-Time or Reflexor modes.

Identical in operation to the Dedicated 1010 Flowmeters, Portable 1010 Meters can be used to evaluate performance at sites intended for future installation of Dedicated 1010 Meters.
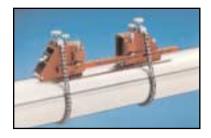
1010WDP Dual Channel Submersible MultiFunction Flowmeter

1010WDP lets you operate in the real world of rain, dirt and flood with identical functionality and reliability provided by the 1010DP in more benign conditions. Complete with available Submersible 1010 Transducers and Cables, and submersible long life battery, 1010 can be left to collect data even in locations subject to flooding.

Portable Clamp-On Transit-Time and Reflexor Transducers

Only two Universal 1010 Transducers are needed for pipes from 1/2″ (12.7 mm) to 240″ (6 M) OD, including Reflexor operation. A third covers pipes up to 96″ (2.4 M). All are equipped with Quick Disconnect cables, in lengths up to 1000 feet (305 M) for operation in remote locations.

1011P Transducers with 1012F Mounting Frames

Portable 1011 transducers can be installed without the Mounting Frames normally used for permanent installations. But when installed at a site exposed to casual disturbance, mounting frames insure installation integrity.

In addition, mounting frames can be left in place permitting exact reinstallation if transducers are temporarily removed for operation elsewhere.

PinStop™ Spacer Bars and Mounting Frames

Controlotron's Patented PinStop Spacer Bar System, eliminates the need to measure transducer spacing.

Use optional 1012 Mounting Frames where long term operation is required for extra stability, or leave in place to assure exact relocation of transducers for periodic Site Survey.

The Dedicated Non-Intrusive 1010 Family outperforms conventional intrusive flowmeters

The Dedicated Family includes NEMA 4X & Compact NEMA 7 Volumetric or Mass Flow Computers in Single, Dual & Four Channel/Path models

⇒ Transit-Time Flowmeter
- ◆ High Precision WideBeam Clamp-On Transducer Operation
- ◆ InLine FlowTube Operation
- ◆ High Precision WideBeam Clamp-On Spool Operation

⇒ Reflexor Fast Fourier Transform Flowmeter
⇒ Digitized Clamp-on RTD Thermal Energy Flowmeter
⇒ Clamp-On Liquid Type and Quality Analyzer

Standard or Optional Features include:

⇒ 240 x 128 Pixel Backlit Graphics LCD Display, with 1 1/8 inch (28.6 mm) digital data or analog trend plots
⇒ 200K or 1 MegaByte Datalogger Memory
⇒ Full Site Setup Menu with OnScreen Help Menu
⇒ Portable CDU or laptop PC for setup of Blind models
⇒ Choice of 115/230 VAC, or 9 to 36 volt DC power
⇒ Bi-directional RS-232 communication permits remote setup, diagnostics and data access
⇒ Multiple 4 to 20 mA current and 0 to 10 Volt assignable analog outputs
⇒ User controllable SmartSlew™ assures fast response with minimal data scatter
⇒ External analog data inputs capability permits special data computation
⇒ Channel/Path Arithmetic Sum/Difference capability

1010DN Dedicated Dual Channel NEMA 4X Clamp-On Flow Computer

Dedicated 1010 Flowmeters operate High Precision Wide Beam 1010N Transducers, or older generation Universal 990 Transducers for those who wish to upgrade existing Controlotron installations. Optional 240 x 128 pixel backlit Graphics Display offers choice of 1 1/8 inch (28.6 mm) data display and a variety of full screen scrollable analog trend displays with remote printout and RS-232 data communication capability. Site Setup and calibration security is standard, with optional 200K or 1 Megabyte dynamic datalogger memory.

1010FTN and 1010SN Flow Computers

These flow computers operate 1011FT Flow Tubes and 1011S Clamp-On Spools respectively, look identical to 1010DN, and provide identical functionality to the 1010N Clamp-On Flow Computer.

Portable and Dedicated 1012 Clamp-On Transducer Mounting Accessories

Temporary mounting of portable 1011HN transducers requires only 1012ML stainless steel chains. For long term mounting, dedicated 1012MS stainless steel straps are recommended. Portable and permanent installation can use the optional 1012F Mounting Frame if protection from accidental contact with transducers is required, or to memorize transducer position for periodic Site Survey applications. Transducers can be spaced to dimensions provided by the 1010 Flow Computer during Site Setup, but use of the 1012B Spacer Bar is recommended.

Dedicated 1011HN transducers use 1012MS stainless steel straps, and use of the 1012F Mounting Frame for long term stability is recommended. Use of the 1012B Spacer Bar is not mandatory, but is recommended to assure simple and accurate transducer installation.

1010 FlowTalk™

Use System 1010 FlowTalk Program to transfer stored datalogger and site setup data to your PC.

Dedicated 1011HN Transducers

1011HN Wide Beam transducers assure high accuracy even if liquids vary in chemistry or sonic properties. Available for most pipe materials, each covers a wide range of wall thickness. Transducers can be mounted with or without recommended 1012 Mounting Frames, and with either Controlotron's time proved Spacer Bar or manually measured transducer spacing. Models are available to cover temperatures from cryogenic range up to 450°F (218°C) and for submersible applications.

Dedicated 1011S Clamp-On Spools

Controlotron's 1010S MultiChordal (up to 10 paths) Clamp-On Spool combines the high reliability & low maintenance of clamp-on ultrasonic flowmetering with the pre-calibrated Custody Transfer accuracy normally provided by Wetted Gaussian Chordal Spool Assemblies. This major advance is available in either Round or Square Spool configurations, with optional flange mounted Profiler to permit installation even in locations of limited straight run. Factory installed 1011S WideBeam transducers maintain calibration even if process conditions vary. Intrinsic sonic density sensing provides Mass Flow to replace Coriolis Flowmeters, offering much lower pressure drop, higher reliability and extremely stable operation, even in applications subject to periodic aeration. 1010SS spool construction is designed to include flow profile conditioning, enabling installation in essentially any pipe configuration while maintaining its pre-calibrated accuracy.
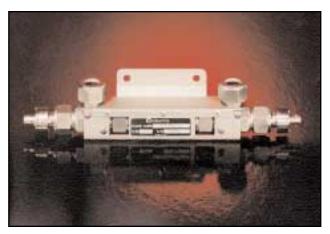
1010X, 1010FTX and 1010SX Flow Computers

These compact NEMA 7 (EExd) Flow Computers are identical in function to their NEMA 4X (IP65) counterparts, except for being limited to Dual Path operation, and use of a 2 x 16 character AlphaNumeric display. The 1010SX can be mounted integrally with the 1011S Clamp-On Spool, eliminating any external transducer cabling. Its AlphaNumeric display can be rotated for upright viewing regardless of installation orientation.

Dedicated 1011FTN InLine FlowTubes

Non-Intrusive 1011FT Flow Tubes provide extraordinary accuracy, (optionally pre-calibrated to 0.2%), for volumetric or mass flow rates normal in pipes from 1/8″ to 3″ (3.2 mm to 76.2 mm) in diameter. Flow detection resolution as fine as 1/1000 GPM or 0.01 pounds per minute (0.0038 LPM or 4.5 grams per minute), permits accurate measurement of very low flowrates. Available in Stainless Steel & selected Plastics, 1011FT Flow Tubes are applicable to any liquid, at pressures up to 4000 psi (28Bar), & at temperatures up to 450°F (232°C). 1010 Flow Tubes can be obtained with optional intrinsic RTD temperature measurement for compensated Mass flow rate.

1011FT Flow Tubes operate with a choice of either NEMA 4 (IP65) or NEMA 7 (EExd) 1010FT Flow Computers, which are available in single, dual and 4 channel models.

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System 1010 Model Selection Chart

The 1010 Model Selection Chart shows all System 1010 Flowmeter Families, and all Standard Models offered by each family. As shown, there are three Standard Flow Computer versions of each model: Red (1), Green (2), and Blue (3). Red offers an optimum combination of functions and cost. Green offers only the most essential functions at lowest cost, and Blue most functions at higher cost. The features offered in the 1010 line are listed in column 3, and those that are included in any Standard model are highlighted in the model's column, in its color.

The Standard Model part numbers are shown just above the Option Code markers for each model. The selected option's Part Number is designated by adding a "1", "2", or "3", for Red, Green or Blue option selections respectively, to the desired Standard Model part number. For example, if the desired model is the recommended WeatherProof Dual Channel Portable (Red), its part number is: **1010WDP1.**

While all the models listed in the Chart are Standard, only some are Stock models. These are designated by the Stock Model Identifier code, the Black marker with the White "S", found just below the Option Code numbers. Stock models are price reduced and are often available for overnight delivery, but if temporarily out of stock, will be delivered within two weeks. Unstocked Standard models are available in from two to four weeks. For the model suggested previously, 1010WDP1, is a Stock model. Part Number 1010WDP2 (Green) is a Standard model, but not stocked, with a 2 to 4 week availability.

To choose a model, follow this simple procedure:
1. Pick the Family of interest for your application, i.e., Portable Clamp-On, Dedicated Clamp-On, etc.
2. Pick the model of interest, i.e., Single Channel, Dual Channel, etc.
3. Pick the Model Option desired, 1,2 or 3, based on the Functions and Features identified in the colors of the chosen Option, Red, Green or Blue. For special models, contact your local Controlotron Sales Representative at 1-800-275-8479 for a price and delivery quotation.

A Word About Controlotron...

35 Years Experience

Controlotron introduced the world's first Clamp-On Transit-Time Flowmeters in 1972, and has led the growth of this technology since then, holding most of the patents in this field, and most innovations, such as:

◇ 1972 First Practical Clamp-On Transit-Time Flowmeter
◇ 1972 First Portable Flowmeter
◇ 1974 First Dual Channel Flowmeter
◇ 1974 First Hybrid Transit-Time / Doppler Flowmeter
◇ 1975 First Clamp-On Thermal Energy Flowmeter
◇ 1976 First Four Channel Flowmeter
◇ 1977 First MultiPath Clamp-On Flowmeter
◇ 1978 First PinStop Mounted Transducers
◇ 1979 First MicroProcessor Based Clamp-On Flowmeter
◇ 1987 First MultiPulse™ Digitally Coded Transmit Flowmeter
◇ 1995 First Synchronously Demodulated Transit-Time Flowmeter
◇ ~~change~~ First Phase Detection and Phase Marker Correlation
◇ 1999 First Accurate Flex Tube Clamp-On Flowmeter

Controlotron has the largest installed base of ultrasonic flowmeters in the world, and the most application experience. This enables Controlotron to recommend the most appropriate model for your application conditions, and provide you with a full Application Guarantee. A highly skilled and experienced Controlotron Flow Specialist is always available to assist you in obtaining the best model for your applications, and can arrange for either Site Survey or Rental to let you see System 1010 performance for yourself.

Controlotron has established support capability in all continents, and the extraordinary communication capability installed in Controlotron instruments permits direct phone line support for Installation, Startup and Maintenance direct from a Controlotron technical center.

Controlotron's innovations are protected under a number of United States and Foreign patents. Controlotron products meet a variety of international quality assurance standards, including ISO 9000 and CE requirements.

Services Include...

✔ Site Survey and Performance Guarantee
✔ Installation Planning and Supervision
✔ OnSite and Remote Equipment Monitoring and Maintenance
✔ Flow Survey Reports
✔ Training and Indoctrination

Worldwide Support

Controlotron's customers are supported by a network of company offices, representatives & distributors covering the entire world.

Corporate Headquarters:
Hauppauge, NY

Domestic Office:
Houston, Texas

Controlotron International Japan, Inc.
Osaka, Japan

Controlotron Europe GmbH
Munich, Germany

Controlotron de Mexico
Mexico City, Mexico

Controlotron Latin America, Inc.
Brazil, Sao Paolo

Controlotron Middle East
Jubail. Saudi Arabia

To contact Representatives and Distributors throughout the world, please call or fax Controlotron in New York.

Your Local Representative:

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