STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration
DIVISION OF CAPITAL ASSET MANAGEMENT AND MAINTENANCE
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Solicitation 7604773

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50 Service Avenue – Scope of Work – Replace Liebert units A&B and Stulz units C&D with new high efficiency Liebert server room HVAC units

WORK DESCRIPTION –

The mechanical scope of this project includes the removal of 2 existing Liebert floor mounted server room HVAC units and 2 Stulz floor mounted server room HVAC units and the installation of 4 new high efficiency Liebert HVAC units in the same approximate locations as the existing units. Each unit needs to be removed allowing remaining existing units to remain on-line while the new unit is being replaced; when the first new unit is online and fully operational, subsequent units can be replaced sequentially, starting with both Stulz units. During all replacements or anytime a cooling unit has been taken out of service, a "Move-in-Cool" portable unit will be set up to cool the "zones" in the server room being affected by the replacement. The indoor units/components will be placed in or near the existing removed locations and the new unit installation shall follow the manufacturers' recommended installation instructions. The manufactures unit stand will be provided by the vendor and stand dimensions need to be field verified prior to release of the equipment. The outdoor condensing components and new refrigeration pumps will be placed in a new laydown area on the east side of the building next to the shed in the outdoor employee break area. During installation of these new Liebert units, include the removal of refrigeration piping between the outdoor and indoor units, install new piping. Provide and installation new refrigerant pump modules to facilitate refrigerant pumping when operating in low outdoor air conditions. The new refrigerant piping to be sized per the manufacturers' recommendations and be connected to the indoor units, refrigerant pumps and outdoor units utilizing existing piping system penetrations and hanger assemblies where it is possible. Modify the existing ductwork, specifically the return ducts, as necessary to allow the installation of the new Liebert units in or near the locations of the removed units.

The electrical scope of this project includes removal of the power wiring from the condensing unit and indoor evaporator/compressor units and re-installation of the power wiring to the new units when installed. The feed and breaker sizes may have to be modified to provide sufficient power to the units. The new refrigerant pump set associated with each unit will require the installation of a new feed to power the new pump sets. Vendor to add electrical and water to condenser laydown area; 120V receptacle service for maintenance tasks, and a garden hose spicket.

The Vendor will be responsible for ensuring that all laborers have the appropriate licensing or certificates for the work being done. The vendor will be responsible for ensuring all appropriate permits are issued for the work being done.

Four (4) Liebert DSE Model DA085DP1AD618C, 460 Volts / 3 Phase / 60Hz, 65,000 Amps Short Circuit Current Rating, Floor mount Precision Cooling Systems: Air Cooled Downflow System

• 14 gauge, welded frame, with Autophoretic coating.
• Motorized impeller, qty 4, with electrically commutated 4.15 HP maximum motor hp
• Dual refrigeration circuits with hot gas mufflers, liquid line filter dryers, refrigerant sight glasses, and electronic expansion valves
• **Designed for R-410A refrigerant. Refrigerant is supplied by and charged by installing contractor.**
• A-frame evaporator coil with stainless steel drain pan
• Front service access
• Supply air exits from the bottom of the unit
• Return air enters the top of the unit
• Exterior panels insulated & powder coated

Main Unit Options:

• Downflow orientation
• 460/3/60 Voltage with 65,000 Amps Short Circuit Current Rating
• Locking Disconnect Included and Dual Float Condensate Pump Included
• EC motor with fans operating inside the unit
• (2) Motors/Unit - (4.15) HP Fan Motor
• Two (2) independent digital scroll compressors, per circuit
• Non-coated indoor evaporator coil
• Infrared humidifier with automatic flush cycle. Capacity of 22 lbs/hr
• Compliance with ASME A112.1.2 section 2.4.2 (backsiphonage testing)
• Three-stage, finned tubular, 304/304 stainless steel electric reheat with a capacity of 15 KW
• 4” Filters, MERV8 rating
• Main Unit Color: ZP-7021 Black Gray Matte
• Return Plenum for ceiling plenum return –
• Standard Floorstand: Height Confirmed prior to equipment release

Controls, Sensors, and Monitoring:

• Liebert iCOM Control with High Definition Display & Audible and Visual Alarms & DSE System Optimization
• iCOM based communication Base Comms & Connectivity includes one Ethernet port and one RS-485 port on iCOM controller, dedicated to supporting BACnet IP, Modbus TCP/IP, BACnet 485 , Modbus 485 and SNMP v1/v2c/v3
• Smoke sensor with unit alarm and shutdown, including supervision contacts
• Compressor overload alarm

• Leak Detection Cable Kit (35’) (LT460-Z35)
• No Remote Temperature and humidity sensors

Liebert EconoPhase pumps in enclosure – Separate power required to the pumps.
EconoPhase Pump Quantity: 2/unit

• PR: EconoPhase Pump Box
• 085: 085 kW
• A: Air Cooled
• A: 460 Volts / 3 Phase / 60 Hz
• 6: Disconnect with 65,000 SCCR
• D: Dual Economizer Pump

Liebert MC CONDENSER Quantity (4) Liebert MC Air-Cooled Microchannel Condenser, Model MCM160E2A, using input supply voltage of 460V/3ph/60Hz

The Liebert MC is an air-cooled condenser featuring an all-aluminum micro channel coil and a variable speed fan motors on every fan. Constructed with an aluminum cabinet, the Liebert MC is a low-profile, direct-drive propeller fan-type air-cooled unit suitable for mounting outdoors. It provides for the heat rejection of one refrigeration circuits, matching heat rejection capacity varying with the outdoor ambient temperatures and compressor heat rejection requirements. The unit is quiet and corrosion resistant. All electrical connections and controls are enclosed in a factory mounted NEMA 3R electrical panel.

Liebert MC Condenser Details:

• Microchannel aluminum coil
• Variable speed EC fans
• Premium electronic control board providing communication with iCOM using CANbus
• Short Circuit Current Rating of 65,000 Amps, rms
• R-410A factory set points and dual refrigerant circuit
• Aluminum exterior panels and 60” galvanized steel legs & braces

Additional Components:

• Refrigerant Receivers: 2 Left Side Refrigerant Receiver(s), 2 Right Side Refrigerant Receiver(s) (per unit)
• Liebert EconoPhase Pump: PR085AA6DDH0000 Quantity: 8 (2/unit)
• 60" Galvanized Steel Legs with Bracing (Shipped Loose)

REPLACEMENT SCOPE OF WORK

1 **Remove existing Liebert and Stulz Units – The units will be shut down and replaced sequentially, one at a time, starting with the Stulz units. Removal of the subsequent unit will not begin until the prior unit has been started and running.**

1.1 SHUTDOWN UNIT - Vendor will shut down the HVAC unit to be replaced while leaving the remaining three HVAC units running. Vendor will position the State provided portable "Move n Cool" air conditioner to properly cool the equipment within the zone of the unit being replaced.

1.2 REMOVE EXISTING DUCTWORK – Vendor will remove the existing ductwork. This will involve cutting back the ductwork with Sawzall's equipped with dust collection devices or hand tin snips to minimize the creation of air born dust. The ductwork will be modified to allow the installation of the new units.

1.3 RECOVER REFRIGERANT FROM EQUIPMENT AND REMOVE PIPING - Vendor will recover all refrigerant from the equipment and equipment piping and recycle per federal regulations. Vendor will remove all refrigerant piping leaving the hanger and hanger assemblies where possible for new refrigerant piping.

1.4 REMOVAL OF OLD UNITS AND DELIVERY OF NEW UNITS – The old units need to be picked up at the loading dock located on the west side of the building. The new units will enter the building at the loading dock. They can be loaded on and off a truck via fork lift, lift gate or slid onto/off of the vehicle via the loading dock edge.

2 **CREATION OF THE OUTDOOR CONDENSING UNIT PAD**

2.1 CREATE NEW CONDENSER PAD AREA ON EAST SIDE OF BUILDING – Vendor to create a new condenser laydown area on the east side of the building, in the northern half of the outdoor employee break area. The 4 condensers and the 8 refrigeration econo-pumps will be placed here. Vendor to excavate and remove vegetation as necessary to pour a new 30ft x 30ft pad that begins at the walkway to the existing shed and extends 30 feet east. The pad is to be 4 to 6 inches thick, using 4000# cement, reinforced with wire mesh. Relief cuts to be made as necessary and have broom surface finish for safety while maintaining the equipment. Vendor to also pour a 3-foot-wide piping and electrical carrier pad connecting the building to the new laydown pad. This will be located on the north side of the existing shed. Cement to be placed using a pump truck over the fence. Upon final condenser installations, vendor to cover leg support areas with mesh to prohibit FOD/Vegetation/animal activity underneath condenser intakes.

2.2 INSTALL NEW STANDS FOR ECONO-PHASE REFRIGERANT PUMPS – Vendor will fabricate and install new mounting stands near the condensing unit locations per

manufacturers' recommendations and the proposed locations on the sketch provided, allowing for full maintenance access of the Pumps and the condensers.

2.3 120V AC POWER AND WATER (BOTH CONDENSER LAYDOWN AREAS) – Vendor to install a work receptacle (120) volts for servicing the units along with a frost-free water supply for hose connection for cleaning during maintenance of the units. The 120V receptacle needs to be installed per code in an outdoor environment and in a weather resistant receptacle box. Water and Electricity to be installed at both condenser laydown areas, east and west sides of the building. (List as a Line Item Adder on Proposal)

2.4 WALL LIGHTING (BOTH CONDENSER LAYDOWN AREAS) – Vendor to add an appropriate wall light to the side of the building for service needs after hours during the night time. The lighting devices must use LED technology. The use of a light sensor is required, so that the lights are on at night and off during day. Lighting to be installed at both condenser laydown areas, east and west sides of the building. (List as a Line Item Adder on Proposal)

2.5 ADDITIONAL SCREEN MESH – Vendor to also place screen mesh around the leg support areas of ALL remaining, previously installed condensers on the old condenser pad, in the old condenser laydown area (west side of building), and condensers near the north loading dock.

1 **RIG NEW HVAC UNIT(S) INTO NEW LOCATION**

1.1 DELIVER AND RIG **LIEBERT MC AIR-COOLED MICROCHANEL CONDENSOR, MODEL MCM160E2A** CONDENSING UNITS AND **ECONOPHASE 085** REFRIGERANT PUMPS – Vendor will provide crane services and labor to rig the new condensing units and refrigerant pumps onto new unit supports. Vendor will provide and install all mounting hardware per manufacturers' recommendations.

1.2 DELIVER AND RIG **LIEBERT DSE MODEL DA085DP1AD618C** INDOOR HVAC UNIT – Vendor to measure and provide a new base for the new indoor LIEBERT units and provide labor and equipment to rig unit into place. Vendor will mount unit on the factory stand per manufacturers' recommendations

2 **PROVIDE NEW REFRIGRANT PIPING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS**

2.1 SIZE REFRIGERATION PIPE PER MANUFACTURERS INSTALLATION INSTUCTIONS – Vendor will identify the refrigerant piping path and calculate the lengths of pipe and sizes needed to meet the manufacturer's installation instructions.

2.2 INSTALL COPPER REFRIGERATION PIPING TO ALL COMPONENTS – Vendor will supply and install new refrigerant piping using manufacturers acceptable piping methods. Vendor will install piping in a neat and workmanlike manner all 90 degree fittings will be long sweep. Vendor will install shut off's and refrigerant components per manufacturer's installation instructions

2.3 PRESSURE TEST REFRIGERATION PIPING – Vendor will pressure test piping to 600# using nitrogen. Vendor will leave the test charge for 24 hours. When test is successfully complete, Vendor will purge all refrigerant lines and place the system in a vacuum.

3 **PROVIDE NEW ELECTRICAL POWER WIRING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS**

3.1 SIZE POWER FEEDS PER MANUFACTURERS INSTALLATION INSTUCTIONS – Vendor will determine the circuit wiring sizes and breaker sizes provide adequate wire and conduit sizes needed to meet the manufacturer's installation instructions. Existing conduit may be used if size is adequate for wiring installation.

3.2 INSTALL NEW 460 VOLT FEED TO NEW ECONOPHASE 085 REFRIGERANT PUMP – Vendor will supply and install new properly sized electrical feed to refrigerant pump per manufacturer's installation instructions.

3.3 INSTALL NECESSARY BREAKERS, STARTERS AND DISCONNECTS FOR NEW UNITS – Vendor will procure and install new circuit breakers in existing panels where required to feed new equipment. If disconnects and/are motor starters are not integral to the equipment Vendor will install disconnects and starters per electrical code and manufacturer's installation instructions.

4 **PROVIDE NEW CONTROL INTERLOCKING WIRING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS**

4.1 PROVIDE CONDUIT TO OUTDOOR UNIT COMPONENTS – Vendor will determine the control wiring sizes and conduit sizes and provide adequate control conductors needed to meet the manufacturer's installation instructions. Existing conduit may be used if size is adequate for wiring installation.

4.2 INSTALL INTERLOCKING CONTROL WIRING BETWEEN INDOOR AND OUTDOOR UNIT COMPONENTS – Vendor will supply and install new control wiring between indoor unit controllers and outdoor factory controllers

4.3 PROVIDE CONTROL WIRING AND COMPONENTS TO INTEGRATE NEW UNITS INTO EXISITNG NIAGARA 4 CONTROL SYSTEM – Vendor will procure and install necessary communication gateways and programming to allow the Liebert unit to be integrated into the existing control and monitoring system. Wiring to the JACE panel and programming located within the space will also be completed. Vendor will modify the existing control system to allow the new unit operational functions to be controlled, alarmed and trended utilizing the existing Niagara control system. Vendor shall do this in house. If a 3rd party vendor is needed, pre-approval will be required by the DCAMM Chief Engineer, as this system is specially tuned to the operations of this building and this room.

5 **PROVIDE MANUFACTURER'S START-UP SERVICES, TEST OPERATION AND DEMONSTRATION OF NEW UNITS**

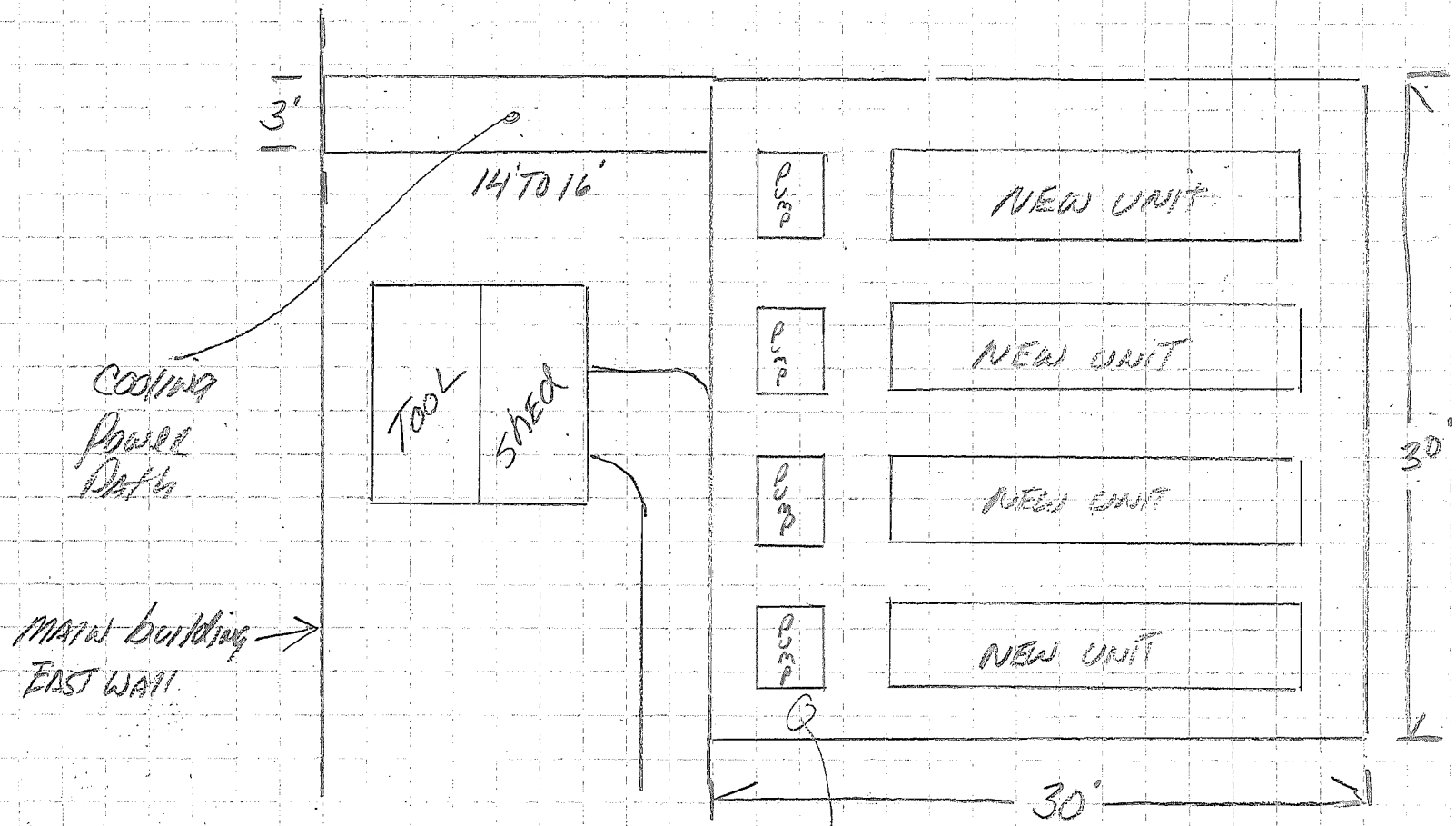
5.1 PROVIDE REFRIGERANT, REFRIGERANT CHARGE AND PRE-START UP COMMISSIONING – Vendor will determine the refrigerant charge needed for the new units and fill with refrigerant. Vendor will check operation of all components. Vendor will check the rotation of all compressors, pump and fans. Vendor will complete all necessary pre-startup activities and check lists. Vendor will hire the manufacturer's trained start-up technician to start the new units and ensure proper operation of the new equipment.

5.2 PROVIDE DEMONSTRATION OF NEW UNIT AND CONTROLS – Vendor will demonstrate the operation of the new Liebert units to the State of Rhode Island. Vendor will provide training in the operation and maintenance of the new units and demonstrate operation of the new units utilizing the Niagara 4 control system via the graphical user interface.

AFTER PROJECT WARRANTY AND SERVICE

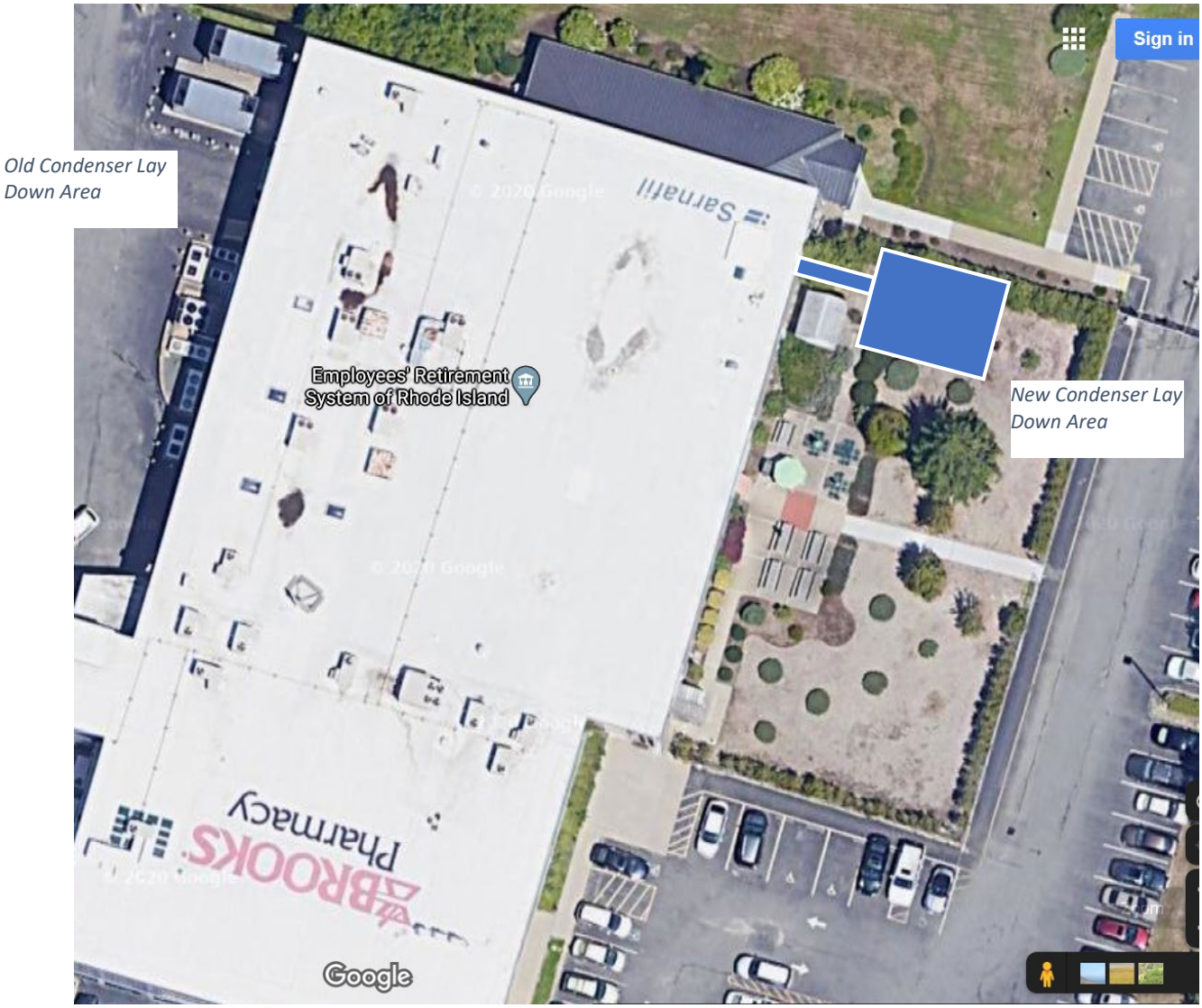
For a minimum of one year after acceptance of the work vendor will respond to warranty calls related to the installation of the new units.

Sketches: New Condenser Placement Laydown Area Photo and Placement Sketch.



SCALE 1/4 = 2'

4" TO 6" Thick
4000#
Wire mesh


Old Condenser Lay Down Area
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Employees' Retirement System of Rhode Island
Sarnafil
BROOKS Pharmacy
Sign in
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