ECKLUND-HARRISON TECHNOLOGIES, INC.

TEMPERATURE MEASUREMENT CATALOG

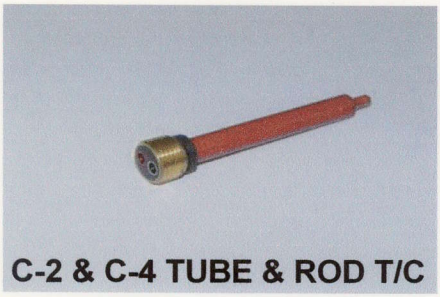
- FOOD CANNING
- BREWING
- PHARMACEUTICALS

THERMOCOUPLES

Ecklund-Harrison Technologies, Inc. manufactures thermocouples which are specially designed for conducting heat penetration tests of packaged foods. The non-projecting connector type thermocouples combine convenience and accuracy. Also, they permit test containers to be filled and closed in the same manner as the commercial pack

We manufacture all the equipment necessary for heat penetration tests and temperature distribution studies, except for the indication or recording instrument. The user may select instrumentation from the simplest single point indicator to the most elaborate computer system. It is necessary only that the instrumentation be of suitable temperature range calibrated for **TYPE T** (copper-constantan) thermocouples.

Correction factors have been published (FOOD TECHNOLOGY, 1956, Vol. X, No. 1, pages 43-44) to correct for errors resulting from heat conducted into conduction heating food products by the thermocouples and fittings. No correction is normally needed for convection heating products or for thermocouples two inches long or longer for any product. The three styles of thermocouples we manufacture are described below. Though they are quite different in appearance, they should provide virtually identical results.



C-2 & C-4 TUBE & ROD T/C

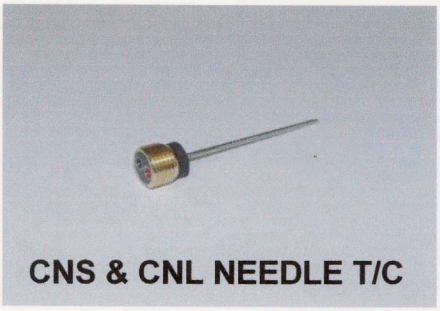
C-2 and C-3 TUBE & ROD THERMOCOUPLES

Tube and Rod (plastic) thermocouples are available in any size from ¾" (19 mm) to 14" (356 mm). They are approximately ¼" (6.4 mm) in diameter.

C-4 FLEXIBLE T/C

C-4 FLEXIBLE THERMOCOUPLE

The C-4 flexible thermocouple is a 4" (102 mm) long insulated (24 gauge) wire thermocouple attached to a 7/16" (11 mm) long molded thermocouple body. Longer wires will be supplied on request. The C-4 style flexible thermocouple is useful in checking heat penetration in chunks of meat, corn on the cob, etc., or as an adjustable length thermocouple.



CNS & CNL NEEDLE T/C

CNS & CNL NEEDLE THERMOCOUPLES

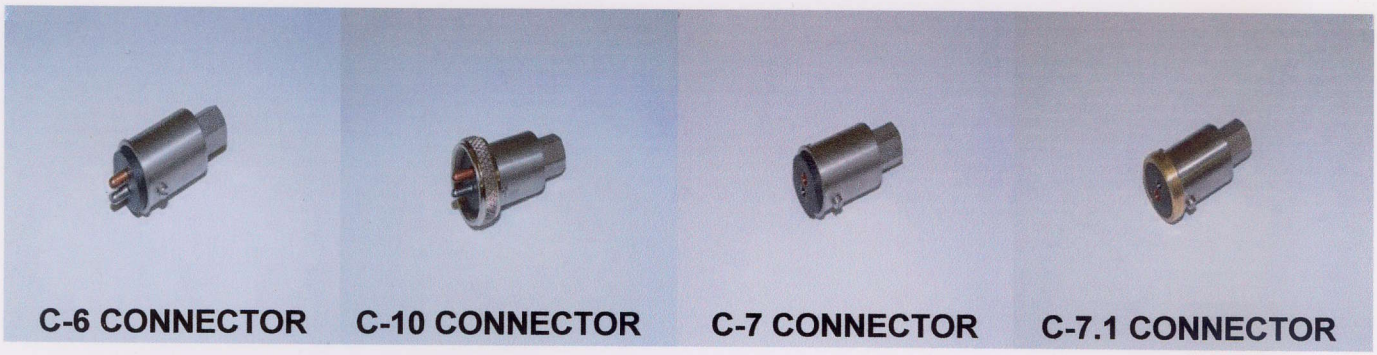
Needle type thermocouples are available in any specified length from ¾" (19 mm) to 14" (356 mm). They feature a 1/16" (1.6 mm) diameter tubular stainless steel body. The small diameter probe has obvious advantages in measuring temperatures inside discrete particles such as chunks of meat. CNS = length 3/4" to 4"; CNL = length 4 1/16" up to 14"

PLEASE SPECIFY THE OVERALL LENGTH OF THERMOCOUPLES DESIRED OR GIVE THE CAN DIAMETER IF THE THERMOCOUPLE IS TO BE INSERTED THROUGH THE SIDE OF THE CAN.

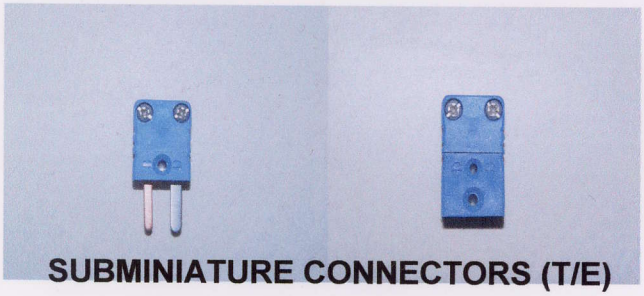
THERMOCOUPLES CONNECTORS

The "Male Connectors" are fittings attached to the ends of the wires (heat penetration cable) which plug into the thermocouples. They are available in the "non-locking" (C-6) and "locking" (C-10). The "locking type should be used when agitation or stress might cause the connector to become disconnected from the thermocouple. The "locking connector incorporates a threaded ring that screws onto the external thread on the locking receptacle securing the connection during processing.

The counterparts for the "male" connectors described above are the female fittings designated as C-7 for the "non-locking" and the C-7.1 for the "locking". They may be used with the male connectors to make a "quick disconnect".



C-6 CONNECTOR **C-10 CONNECTOR** **C-7 CONNECTOR** **C-7.1 CONNECTOR**



SUBMINIATURE CONNECTORS (T/E)

SUBMINIATURE CONNECTORS (T/E) - These connectors are characterized by a flat blade and are manufactured from Type "T" (copper-constantan) materials. They are used to connect leads to the ECKLUND ESRA (slip ring assembly) and are compatible with many data loggers. They are available in male or female (shown).

GASKETS FOR THERMOCOUPLES AND RECEPTACLES

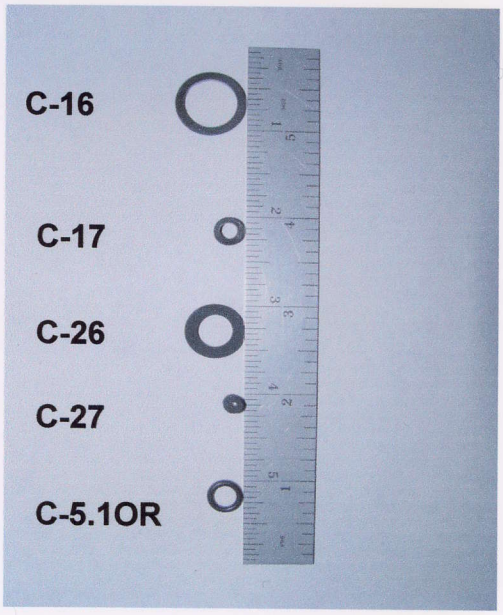
C-16 - Gaskets for C-5 and C-9 thermocouple receptacles. These gaskets have an outside diameter of 3/4 of an inch (19 mm) and are manufactured in black.

C-17 - Gaskets for thermocouples. These gaskets have an O.D. of 5/16" and are used on all thermocouples.

C-26 - Gaskets for pouch receptacle (C-5.1) and pouch stuffing box (C-5.2). This gasket has a 5/8" (15.9 mm) outside diameter.

C-27 - Rubber packing gasket for Pouch Stuffing Box (C-5.2). This gasket is used to seal wire in the pouch fitting.

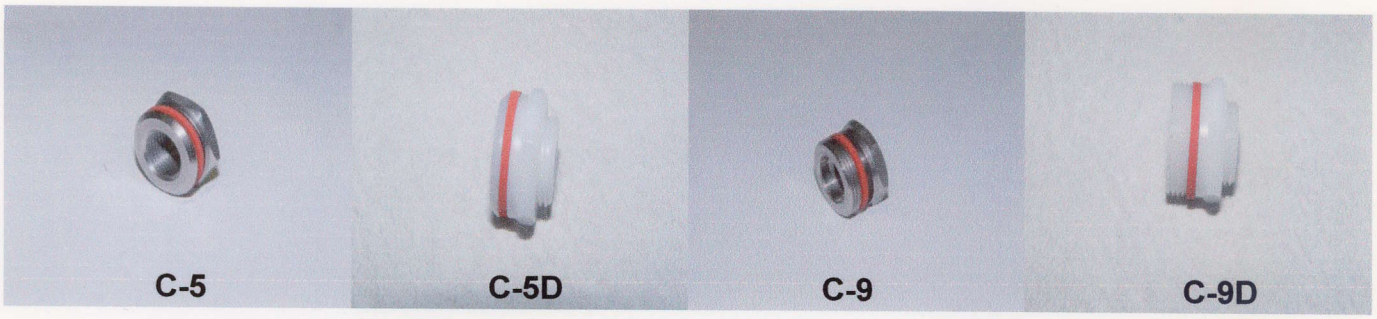
C-5.1OR - "O" ring gasket for C-5.1M and C-5.1ML pouch receptacles.



HS Sleeve (Heat Shrink Sleeve) - A composite tubing used to shrink over the ends of temperature distribution leads and provide strain relief on connector installation.

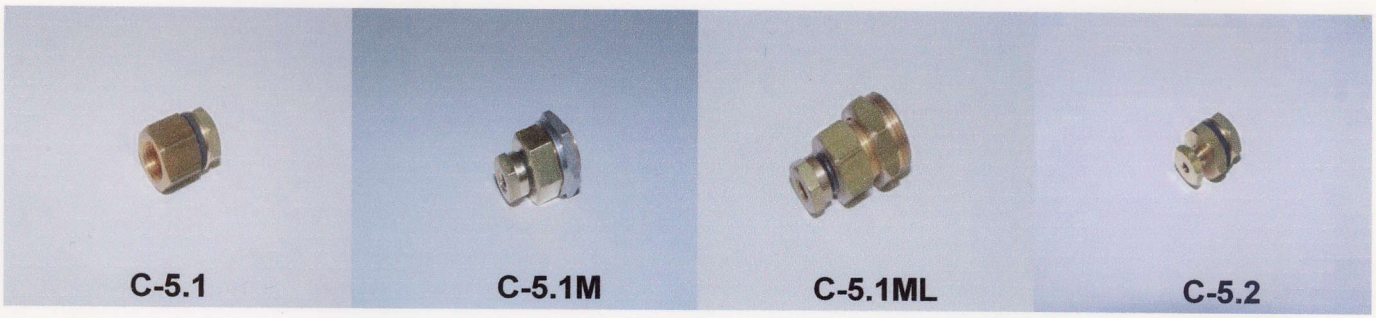
THERMOCOUPLES RECEPTACLES

The receptacles are fittings machined from either stainless steel, brass, or Delrin. A hole is punched in the container (can, pouch, etc.) and the body of the receptacle is passed through the hole. A nut is then threaded onto the body of the receptacle. The thermocouple is threaded into the internal threads of the receptacle and hand-tightened with the thermocouple spanner wrench (C-14). When property installed, the thermocouple and thermocouple receptacle provide an hermetic seal for processing.



C-5 NON-LOCKING RECEPTACLE - The C-5 is a two piece receptacle machined from stainless steel and the most frequent choice for tests in metal cans in "still" or non-agitating retorts. It is used with the C-6 Non-locking connector. The **C-5D** is identical to the C-5, except that it is machined of Delrin.

C-9 LOCKING RECEPTACLE - The C-9 is identical to the C-5 except that it has an additional external thread for locking the connector (C-10) to the receptacle (C-9) to prevent accidental disconnection during a rotating or agitating process. It is used with the C-10 locking connector. The **C-9D** is identical to the C-9, except that it is machined of Delrin



C-5.1 PLASTIC POUCH RECEPTACLE - The C-5.1 was designed for use with plastic pouches and is used with the C-2, the C-3, the CNS, and the CNL thermocouples.

C-5.1M THERMOCOUPLE FOR PLASTIC POUCH—MODIFIED - This design requires only a 1/4" hole through the pouch. This hole may be punched through the flange area by means of an ordinary 1/4" paper punch. The seal is completed by an "O" ring inserted on the inside of the package. The outer end of the receptacle has an external thread and nut to permit mounting on an angle bracket. This receptacle is is usable only with CNS and CNL thermocouples.

C-5.1ML THERMOCOUPLE FOR PLASTIC POUCH—MODIFIED (LOCKING) - This is the same as the C-51M, but is designed for use with locking connectors (C-10).

C-5.2 STUFFING BOX -The C-5.2 is a four part brass stuffing box designed to seal thermocouple wire into a plastic pouch.

THERMOCOUPLE LEAD WIRE

All of our thermocouples and lead wire are made from specially selected, oxygen-free, "type T" alloys. This means the maximum conformity error is the greater of plus or minus 0.5 degrees Celsius or .4% of the temperature being read in Celsius (this is one-half the deviations permitted for standard thermocouple quality materials). These errors can be eliminated through calibration procedures and are not indicative of the total measurement error which may be found in a particular system.

We ordinarily recommend heat penetration cables containing 7 to 16 duplex lead wires, this will permit testing 5 to 15 cans (jars, pouches, bottles, etc.) at a time. The remaining wires are made up with a welded junction for measuring retort temperature.

TEF-24 - A premium grade, single strand, 24 gauge copper-constantan lead wire with extruded Teflon insulation and overwrap.

TEF-20 - A premium grade, single strand, 20 gauge copper-constantan lead wire with extruded Teflon insulation and overwrap.

TEF-22-S - A premium grade, multiple strand, 22 gauge copper-constantan lead wire with extruded Teflon insulation and overwrap.

SIL-22-S-TS - A premium grade, multiple strand, 22 gauge copper-constantan lead wire with a Teflon insulation over the conductors and a silicone overwrap over the insulated conductors. The construction of this wire assures a very flexible wire with the Teflon wrap adding durability.

PACKING GLANDS (STUFFING BOXES)

Due to the pressure inside the retorts, a packing gland or stuffing box must be used to pass the wires (the heat penetration or temperature distribution cable) into the vessel. The installation of a "stuffing box" , the C-24 or C-24-S. will permit the introduction of the wires into the retort while preventing steam from exiting the hole. If a cable is to be removed or installed frequently, the "swivel-type" (C-24-S) is recommended as it permits screwing the stuffing box into the retort without twisting the cable. "Flange" stuffing boxes are also available C-24-FL.

C-24 STUFFING BOX

C-24-S "SWIVEL TYPE" STUFFING BOX

C-24-FL FLANGE STUFFING BOX

PROCESS SIMULATOR & ROTATING RETORT EQUIPMENT

ESRA (Ecklund Slip Ring Assembly) - Several types of agitating retorts require the use of multiple circuit slip ring assemblies at the end of a rotating shaft to conduct thermocouple signals from a rotating to stationary mode. Such devices can be very troublesome if foreign metals (not thermocouple metals) are part of the circuit and/or temperature differentials exist across the slip ring assembly. In our opinion, it is best to build the slip ring assembly using thermocouple materials in the conductive circuits and isolate the assembly from the end of the hot retort shaft to minimize temperature differentials.

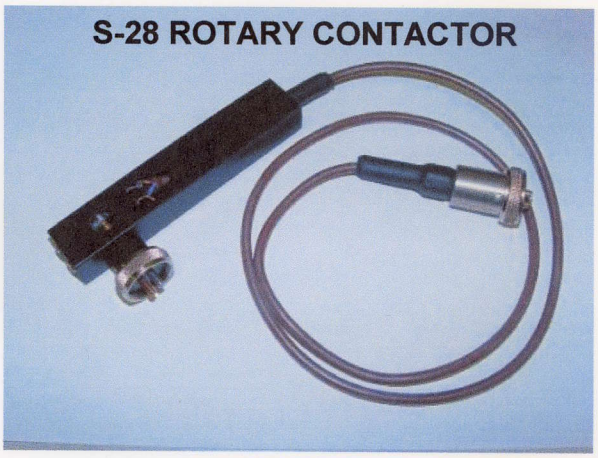
The **ECKLUND SLIP RING ASSEMBLY** is designed to provide isolation from temperature differential and is built of compensating materials for type "T" (copper-constantan) thermocouples, The rotor shaft is mounted on sealed ball bearings for durability.

Though the 16 circuit unit is considered standard, we can provide the Slip Ring Assembly with 6 to 32 circuits. The design of the unit permits installation on virtually any style of rotating retort with minimum difficulty.

ESR-HUB - This is an 18 circuit "hub" for installation on the FMC Steritort. The unit comes with 18 S-31's mounted in the hub. This permits the use of up to 18 rotary leads instead of the standard 6.

The design incorporates a 1 1/4" NPT stainless steel pipe nipple which threads into the shaft of the FMC Steritort.

S-28 ROTARY CONTACTOR - For use in conducting heat penetration tests in rolling cans in FMC Steritorts. The rotating parts are small in diameter to reduce frictional torque. The rotor may be removed for cleaning by removing a snap ring. No adjustments are necessary on re-assembly. Supplied with a 3' (0.91 meters) of SIL-22-S-TS wire and a locking connector to connect into the hub of the Steritort. It can be used with any style Ecklund thermocouple, but the CNS and the C-2 types are recommended.



TOOLS AND ACCESSORIES

The following special "tools" were designed to facilitate the installation of the thermocouple in the metal can, semi-rigid plastic container, plastic pouch, jar, etc.

C-11
COMBINATION CAN PUNCH

C-11 COMBINATION CAN PUNCH & COUNTERSINK - Used to punch a hole and provide a flattened surface to permit installation of the C–5 and C-9 thermocouple receptacles. The C-11 is a two piece "draw through" construction that requires a pilot hole to be made with an C-15 Awl. In addition to being cost-effective, it can be used on the can end as well as the can side.

C-12 LEVER TYPE CAN PUNCH

C-12 LEVER TYPE CAN PUNCH - Used only on the side of a can or to punch a hole in a can lid before sealing the lid to a can. It does not require a pilot hole. If you anticipate numerous tests and are inserting the thermo-couple in the side of a can. The C-12 will add speed and convenience to the operation.

C-14 THERMOCOUPLE SPANNER WRENCH - The C-14 was designed specifically to tighten the thermocouple in the receptacle. Proper seating of the thermocouple requires only the fingers of the technician - **a wrench should never be used** on the spanner wrench. The **C-14-S** is the same as the C-14, only with a screwdriver handle.

C-13 END WRENCH

C-13 END WRENCH - The C-13 has a 3/4" end for tightening the C-5 and -C-9 Thermocouple Receptacles.

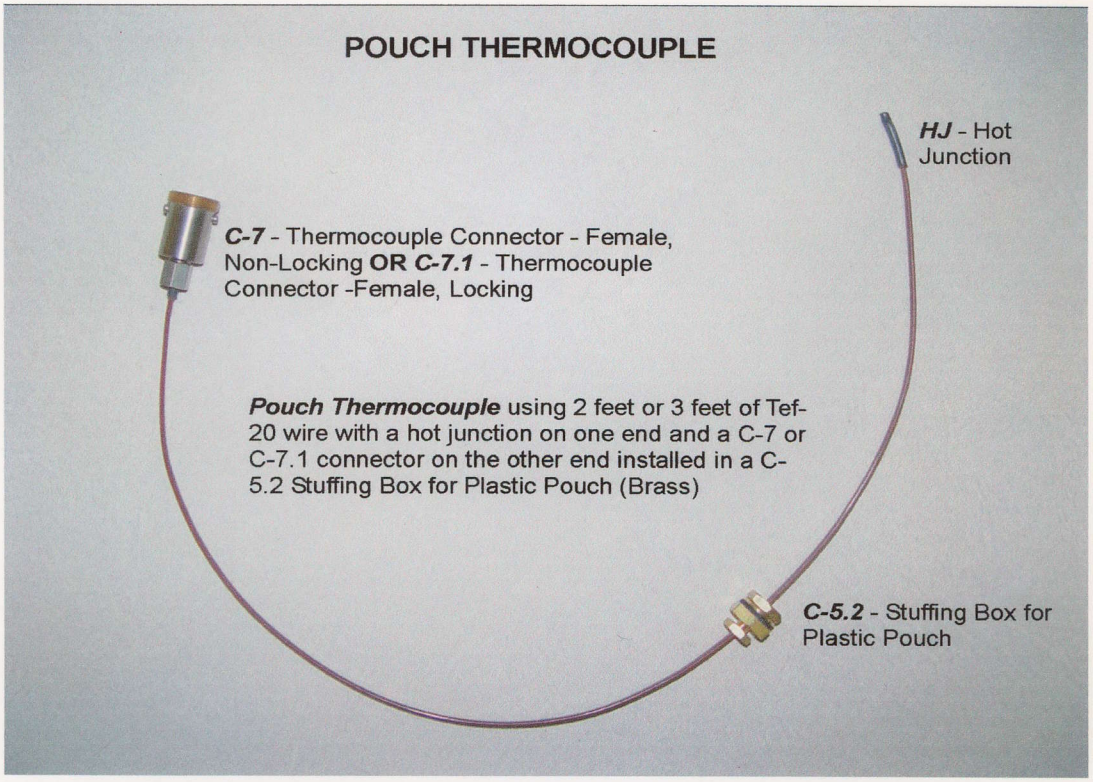
C-14 SPANNER WRENCH

C-14-S SPANNER WRENCH WITH HANDLE

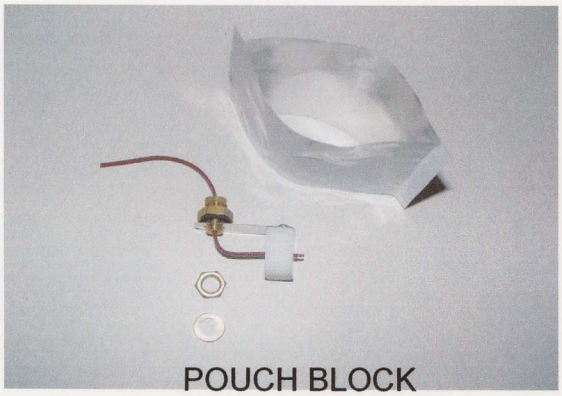
C-15 AWL

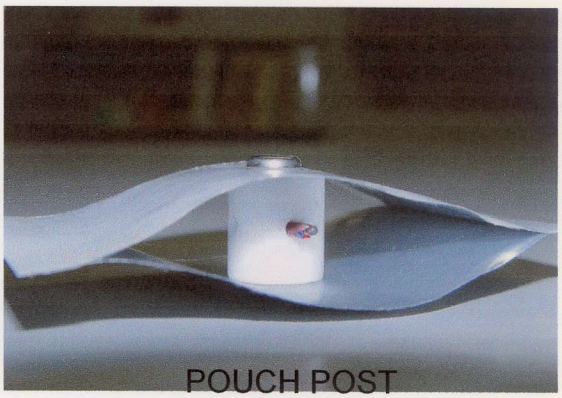
C-15 AWL - The C-15 is used to make a pilot hole for the C-11 Combination Can Punch and Countersink. The Awl shaft diameter is 1/4" (6.4 mm).

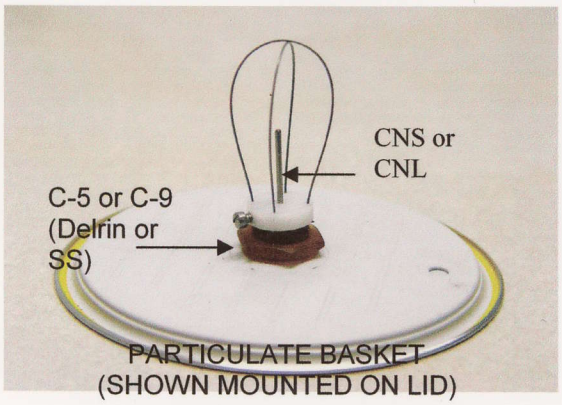
WORK IN POUCHES



The **Pouch Block** or **Pouch Post** is used for positioning the hot junction of the pouch thermocouple in the pouch. The block or post height depends on the filled thickness of the pouch.


POUCH BLOCK


POUCH POST

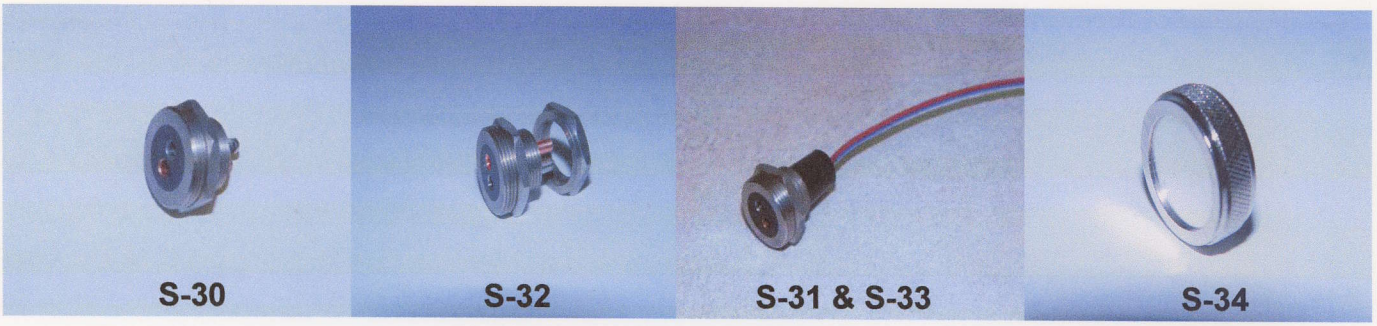


PARTICULATE BASKET (SHOWN MOUNTED ON LID)

The **Particulate Basket** is used in conjunction with a C-5 or C-9 Receptacle (Delrin or Stainless Steel) and the CNS or CNL thermocouple to position discrete particles (chunks) of food for processing.

SURFACE MOUNTING LOCKING FEMALE RECEPTACLES

A female locking connector designed to be used with the C-10 Locking Connector for special applications. The female contacts are embedded in epoxy for an hermetic seal.



S-30 SMLFC - The S-30 is for use in the hub of an FMC Steritort for connection of Rotary Contactors.

S-31 SMLFC - The S-31 is the same as the S-30 with a five feet length of wire attached ready for installation in the FMC Steritort.

S-32 SMLFC - The S-32 is identical to the S-30, but comes with a separate nut. These may be used for constructing a thermocouple connector panel inside a retort. Not recommended for use through a retort wall.

S-33 SMLFC - The S-33 is identical to the S-32, but the customer may indicate any length of wire that is to be attached. There is an additional charge for the wire.

S-34 PROTECTIVE CAP - A protective cap for items S-30, S-31, S-32, & S-33, when they are not in service.

PASTEURIZATION MONITOR COMPUTER

FOR USE IN TUNNEL PASTEURIZERS

The PM-4 travels with the product through the tunnel pasteurizer. A product container (can or bottle) is placed in a "sample basket" and the temperature of the cold spot is monitored with a precision RTD temperature probe. A second precision RTD temperature probe monitors the ambient spray temperature. Product temperature as a function of time is measured and used to calculate Pasteurization Units (PU's). Spray and product temperatures, maximum cold spot temperature, and elapsed time are all recorded and saved in memory. To store a permanent record of the product run, the PM-4 may be interfaced to a Windows® based computer using the optional IR reader.

Our Windows® compatible software provides the capability to store data, produce screen displays, and print graphs. The PM-4 software is very user friendly and easy to install.

PM-4

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