ID NUMBER of INDEPENDENT PARAMETRIC VARIABLE*

Primary Refrigerant/Air Throughput Variables

1 multiplier of compressor displacement value set in the HPDATA input by DISPLB and/or CAPSEL

2 QANMI, nominal indoor air flow rate (cfm)

3 QANMO, nominal outdoor air flow rate (cfm)

Primary Hx Area Variables (Where Total Hx Area Is Allowed To Vary)

4 AAFI , frontal area of indoor coil (ft^2)

5 AAFO, frontal area of outdoor coil (ft^2)

6 NTI, number of indoor refrigerant tube rows

7 NTO, number of outdoor refrigerant tube rows

8 FPI, air-side fin spacing in indoor coil (fins/inch)

9 FPO, air-side fin spacing in outdoor coil (fins/inch)

10** HXMULT, total Hx area multiplier relative to baseline values in the heat pump data file HPDATA,
      Hx configurations adjusted to maintain approximately constant fan power requirements

Flow Control Variables

11 DTROC, refrigerant subcooling at condenser exit (R)

12 TXVRAT, capacity of the TXV (tons)

13 CAPL, length of expansion device or superheat of TXV at rating condition

14 ORIFD, diameter of short-tube orifice (inch)

Charge Control Variables

15 SUPER, compressor inlet superheat (R)

16 REFCHG, system refrigerant charge (lbm)

Air-Side-Condition Variables

17 TAIII, temperature of fluid entering indoor unit (F)

18 TAIIO, temperature of fluid entering outdoor unit (F)

19 RHII, indoor relative humidity

20 RHIO, outdoor relative humidity

Modulation Variables

21 CMPFRQ, operating compressor drive frequency (Hz)

22 FRQIDF, operating indoor blower frequency (Hz)

23 FRQODF, operating outdoor blower frequency (Hz)

24 CFRQRT, operating compressor drive frequency ratio (relative to nominal)

25 FRQRTI, operating indoor fan drive frequency ratio (relative to nominal)

26 FRQRTO, operating outdoor fan drive frequency ratio (relative to nominal)

Motor Sizing Variables

27 CSIZMT, nominal motor size for selected compressor (hp),
            not to be used with varying displacement or fixed capacity cases

28 SIZMTI, nominal indoor blower motor size (hp)

29 SIZMTO, nominal outdoor fan motor size (hp)

Hx Design Variables (Where Total Hx Area For Both Coils Is Held Constant)

Independent of Total Hx Area

30 NSECTI, number of equivalent indoor circuits

31 NSECTO, number of equivalent outdoor circuits

32 DDUCT, indoor duct size (given as positive value for diameter in inches) or external pressure drop (given as negative value for inches of H2O)

Fixed Area Ratio, Tradeoff Variables For Single Hxs Holding Individual Hx Area Constant

33 NTI (vs AAFI), # of indoor refrigerant tube rows vs frontal area -- *FPI held constant*

34 NTO (vs AAFO), # of outdoor refrigerant tube rows vs frontal area -- *FPO held constant*

35** FPI (vs AAFI), indoor fin pitch (fins/in) vs frontal area -- *NTI held constant*

36** FPO (vs AAFO), outdoor fin pitch (fins/in) vs frontal area -- *NTO held constant*

37** FPI (vs NTI), indoor fin pitch (fins/in) vs # of tube rows -- *AAFI held constant*

38** FPO (vs NTO), outdoor fin pitch (fins/in) vs # of tube rows -- *AAFO held constant*

Adjustable Area Ratio, Tradeoff Variables Across Hxs Holding Total Hx Area Constant

One-Variable-Adjustment

39** FRACI with AAFI, fraction of total area in indoor coil, frontal area AAFI adjusted and
    offset by AAFO to maintain fixed total Hx area -- *fixed NT and FP*

40** FRACO with AAFO, fraction of total area in outdoor coil, frontal area AAFO adjusted and
    offset by AAFI to maintain fixed total Hx area -- *fixed NT and FP*

41** FRACI with NTI, fraction of total area in indoor coil, # of tube rows NTI adjusted and
    offset by NTO to maintain fixed total Hx area -- *fixed AAF and FP*

42** FRACO with NTO, fraction of total area in outdoor coil, # of tube rows NTO adjusted and
    offset by NTI to maintain fixed total Hx area -- *fixed AAF and FP*

43   FRACI with FPI, fraction of total area in indoor coil, fin spacing FPI adjusted and
    offset by FPO to maintain fixed total Hx area -- *fixed AAF and NT*

44   FRACO with FPO, fraction of total area in outdoor coil, fin spacing FPO adjusted and
    offset by FPI to maintain fixed total Hx area -- *fixed AAF and NT*

Two-Variable-Adjustment

45** FRACI, with fraction of total area in indoor coil, AAFI and NTI adjusted and
    offset by AAFO and NTO to maintain fixed total Hx area -- *fixed FP*

46** FRACO, with fraction of total area in outdoor coil, AAFO and NTO adjusted and
    offset by AAFI and NTI to maintain fixed total Hx area -- *fixed FP*

47** FRACI, with fraction of total area in indoor coil, AAFI and FPI adjusted and
    offset by AAFO and FPO to maintain fixed total Hx area -- *fixed NT*

48** FRACO, with fraction of total area in outdoor coil, AAFO and FPO adjusted and
    offset by AAFI and FPI to maintain fixed total Hx area -- *fixed NT*

49** FRACI, with fraction of total area in indoor coil, NTI and FPI adjusted and
    offset by AAFO and FPO to maintain fixed total Hx area -- *fixed AAF*

50** FRACO, with fraction of total area in outdoor coil, NTO and FPO adjusted and
    offset by AAFI and FPI to maintain fixed total Hx area -- *fixed AAF*

Three-Variable-Adjustment (Maintains Approx. Constant Fan Powers)

51** FRACI w/NTI, AAFI, and FPI, fraction of total area in indoor coil, NTI, AAFI, and FPI adjusted

and offset by NTO, AAFO, and FPO to maintain fixed total Hx area

52** FRACO w/NTO, AAFO, and FPO, fraction of total area in outdoor coil, NTO, AAFO, and FPO adjusted and offset by NTI, AAFI, and FPI to maintain fixed total Hx area

All ID's > 52 newly added for Mark VI&VII

Individual HX Tube Parameters

53 DEAI, outside diameter of tubes in indoor heat exchanger, inside diameter adjusted accordingly

54 DEAO, outside diameter of tubes in outdoor heat exchanger, inside diameter adjusted accordingly

55 THKTBI, tube wall thickness in indoor heat exchanger, outside diameter adjusted accordingly

56 THKTBO, tube wall thickness in outdoor heat exchanger, outside diameter adjusted accordingly

Air Inlet Wet Bulbs or Glycol Weight Percentages

57 TWBII, for indoor air, it is wet bulb; for indoor glycol, it is weight fraction concentration (%)

58 TWBIO, for outdoor air, it is wet bulb; for outdoor glycol, it is weight fraction concentration (%)

Additional Individual HX Parameters

59 FINTYI, type of fin surface or water-to-refrigerant heat exchanger to indoor heat exchanger

60 FINTYO, type of fin surface or water-to-refrigerant heat exchanger to outdoor heat exchanger

61 HTRMLI, multiplier of refrigerant side heat transfer coefficient to indoor heat exchanger

62 HTRMLO, multiplier of refrigerant side heat transfer coefficient to outdoor heat exchanger

63 PDRMLI, refrigerant side pressure drop multiplier to indoor heat exchanger

64 PDRMLO, refrigerant side pressure drop multiplier to outdoor heat exchanger

65 HTAMLI, multiplier of fluid side heat transfer coefficient to indoor heat exchanger

66 HTAMLO, multiplier of fluid side heat transfer coefficient to outdoor heat exchanger

67 PDAMLI, fluid side pressure drop multiplier to indoor heat exchanger

68 PDAMLO, fluid side pressure drop multiplier to outdoor heat exchanger

69 CABMLI, unit or system pressure drop multiplier to indoor

70 CABMLO, unit or system pressure drop multiplier to outdoor

More Hx Design Variables (Where Total Hx Area Across Both Coils Is Held Constant)

HX Two-Variable Control With Adjustable Hx Area Ratios, Constant Fan Power (Where Total Hx Area Across Both Coils Is Held Constant)

71** FRACI, AAFI and FPI adjusted, fixed NTI, approx. constant fan power

72** FRACO, AAFI and FPI adjusted, fixed NTI, approx. constant fan power

Compressor Parameters

73 CAPSEL, compressor displacement (0<x<=100), capacity (x>100) or scaling factor (if <0)

74 EERSEL, compressor EER at rating condition (x>0) or scaling factor of EER (if <0)

Fan Power Parameters

75 WDFIDF, default fan power value (W) per 1000 SCFM or pump power (W) per GPM to indoor side

76 WDFODF, default fan power value (W) per 1000 SCFM or pump power (W) per GPM to outdoor side

77 FANEFI, indoor fan power definition

78 FANEFO, outdoor fan power definition

More Hx Design Variables (Where Total Hx Area Across Both Coils Is Held Constant)

Multipliers for Individual Coils

79** HXMULTI, multiplier to adjust area on indoor coil

80** HXMULTO, multiplier o adjust area on outdoor coil

Air Inlet Humidity Ratios

81 WAII, indoor humidity ratio (lb water / lb of dry air)

82 WAIO, outdoor humidity ratio (lb water / lb of dry air)

More Hx Design Variables (Where Total Hx Area Across Both Coils Is Held Constant)

Proportional Airflow and HX Face Area Adjustment on One Coil Only

83** QANMI, indoor airflow while maintaining constant face velocity and refrig-side pressure drop by adjusting face area and number of circuits (cfm)

84** QANMO, outdoor airflow while maintaining constant face velocity and refrig-side pressure drop by adjusting face area and number of circuits (cfm)

Line Loss Delta-T

85 DTDSLN, discharge line temperature drop [R]

Specified Suction Pressure Control

86 TSICMP, specified suction saturation temperature, to be used in conjunction with IEVSET =1 in HPDATA input

*See the HPDATA input descriptions for definitions of the independent variables

**Refrigerant circuiting adjusted to hold refrigerant-side pressure drop constant

Caveats on Allowable Parametric Combinations

     NOTE: FOR PROPER OPERATION:

     IF ID#10 is used with other higher numbered parameters
     that adjust any HX-area-related quantity
     -- such as FRACI, AAFI, NTI, FPI, FRACO, AAFO, NTO, FPO,
     then ID#10 should be the first contour variable of the pair

     Also, as they have conflicting purposes,
     ID#'s 4 through 9 and ID#'s 30 and 31 should not be used with ID#10
     or the higher # parameters dealing with area quantities