HEIDENHAIN

ND 2100 G
GAGE-CHEK

Gage-Chek Formulas Quick Reference

Adding formula functions

Add functions to the formula line by pressing softkeys below and to the right of the LCD screen. The example sequence of softkey presses shown below creates the formula: A = C1
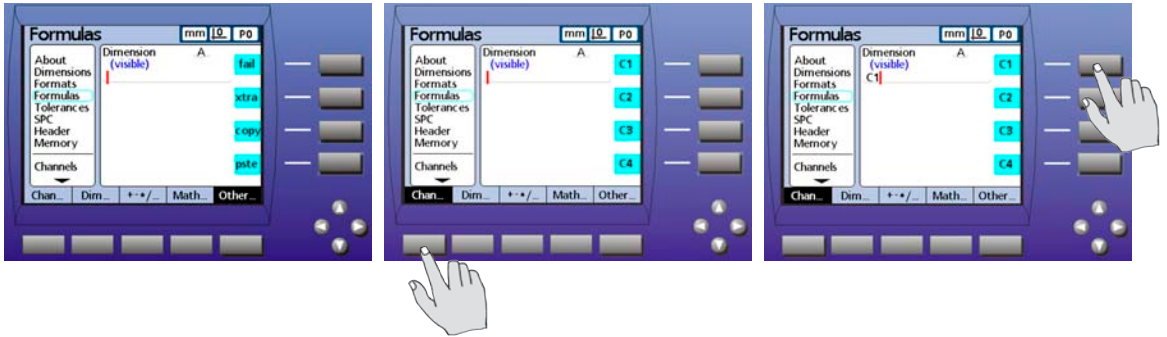
Available formula functions

The map of available formula functions shown below can be used to find and add specific functions to the formula line. For example, to add the Din function, press the Other softkey repeatedly until Xtra is diplayed at the right of the LCD, press the Xtra softkey to display the Xtra menu and then select Din from the menu.

Chan…	Dim…	+ - * /	Math	Other			
C1	A	+	sqrt	if			
C2	B	-	exp	case			
C3	C	*	min	seq			
C4	D	/	max	trip			
		(	sin	dmin			
Gage-Checks	The number of	)	asin	dmax		*Xlatch is available in systems	
can be ordered	dimensions is	,	cos	davg		that include the external	
with 1, 4, 8 or	specified for	;	acos	dmd		edge-detection option	
16 inputs	each part in the	>	tan	fail			
	dimensions	>= (≥)	atan	xtra	xtra menu		
	setup screen	<	avg	copy	Ask	HwDmn	Report
		<= (≤)	md	pste	Beep	HwDmx	RsetDyn
		== (=)	abs		ClrTrig	HwLx	Scan
		!= (≠)	mod		DateStr	Lookup	Send
		&& (AND)	int		Din	Loop	SendMsg
		|| (OR)	pi		Display	Master	SendRec
					Dout	OnEvent	SetTrig
					FnCall	PartNo	Setup
					FnDefine	Preset	Time
					FnParam	Recall	TimeStr
					FnReturn	Relay	Var
					Global	Remark	Xlatch*

	= Basic function
	= Advanced function
	= Editing function

Formula function summary

Key:
   Anything in brackets **[ ]** is optional
   … means the previous optional pattern can repeat
   | means "or"

Syntax	Description
C#	Returns the value of channel number (1..16)
DIM[([v1] [,v2])[,v3])]	Returns the value of the visible dimension
	DIM (A..Z|0..9 [A..Z|0..9] [A..Z|0..9])
	optionally at record number v1 (0+)
	optionally for part number v2, optionally with a default value v3
HDIM	Returns the value of hidden dimension
	HDIM (A..Z|0..9 [A..Z|0..9] [A..Z|0..9])
+	Addition
-	Subtraction
*	Multiplication
/	Division
>	Conditional "greater than"
>=	Conditional "greater than or equal to"
<	Conditional "less than"
<=	Conditional "less than or equal to"
==	Conditional "equal to"
!=	Conditional "not equal to"
&&	Logical And
||	Logical Or
;	Statement separator (must be outside of all parentheses levels)
1.23	Number (can have units mm, in, deg, etc… following to it)
v1 exp v2	Returns v1 raised to the v2 power
abs(v1)	Returns the absolute value of v1
acos(v1)	Returns the arc cosine of v1
asin(v1)	Returns the sin of v1
Ask*"Abc"	Prompt "Abc" after every data record entry, and when the system is started
Ask!"Abc"	Prompt "Abc" every time this function is executed
Ask1"Abc"	Prompt "Abc" when the system is started
AskT#"Abc"	Displays "Abc" when the function is executed, for # seconds
atan(v1)	Returns the arc tangent of v1
avg(v1,v2[,v3]…)	Returns the average value of all arguments
Beep	Makes a beep sound
case(v1,v2[,v3,v4]…,,v5)	Return v2 if v1 is true, optionally return v4 if v3 is true, else return v5
ClrTrig#	Resets existing trigger # (0..9) for reuse

cos(v1)	Returns the cosine of v1
DateStr	Returns the current system date
din(v1)	Return the status (0/1) of line v1 (1..5)
Display(dim,numaxes)	Sets the current graph display starting at dimension dim, with num axes (dimensions) displayed
davg(v1,depth)	Returns the average of v1 over time over a max of depth values
dmd(v1,depth)	Returns the median of v1 over time over a max of depth values
dmn(v1[,v2])	Returns the min of v1 over time, or can return the value of v2 at v1 min. v3 default val
dout(v1,v2)	Set output line v1 (1..9) to v2 (0/1), returning the current value of output line v1
dmx(v1[,v2])	Returns the max of v1 over time, or returns the value of v2 at v1 max. v3 default val
fail()	Returns 1 if any dimensions fail their tolerance
fail(DIM1,[DIM2]…)	Returns 1 if any of the listed dimensions (DIM1, DIM2, etc…) fail their tolerance
FnCall(fn,[p2]…)	Calls function fn, with parameters p1, p2, etc..
FnDefine(fn,a1[,a2]..)	DefFn; fn is function number, a1 etc is calls to other functions, can be separated by commas
FnParam	Param1..Param9 parameters can be passed to a function
FnReturn	Return; immediately executes a function (does not execute any other steps)
Global#([v1])	Return the value of global variable # (1..20), or optionally assign v1 to it
HwDmn(C#[,C##][,v1])	Returns the real-time min of channel # (1..8) over time, or optionally returns the value of channel ## (1..8) at channel # min. v1 default val.
HwDmx(C#[,C##][,v1])	Returns the real-time max of channel # (1..8) over time, or optionally returns the value of channel ## (1..8) at channel # max. v1 default val.
HwLx(C#,C##,v1)	Returns the value of channel C## when C# crosses the position v1
if(v1,v2,v3[,tog])	Returns v2 if v1 is true, else returns v3. If tog is defined (e.g. 1) then v2 is calculated once, until the condition changes, then v2 is calculated once, etc..
int(v1)	Returns the integer value v1 without any fraction
LookupXXX	Returns values for various setting:
BarMax(dim)	Returns the current part bar graph max setting for the given dimension
BarMin(dim)	Returns the current part bar graph min setting for the given dimension
Calc6Sig(dim)	Returns the current part's calculated 6 sigma for the given dimension
CalcCp(dim)	Returns the current part's calculated cp for the given dimension
CalcCpk(dim)	Returns the current part's calculated cpk for the given dimension
CalcMax(dim)	Returns the current part's maximum for the given dimension
CalcMean(dim)	Returns the current part's calculated mean for the given dimension
CalcMin(dim)	Returns the current part's mimumum for the given dimension

LookupXXX (continued)	Returns values for various setting:
CalcPp(dim)	Returns the current part's calculated pp for the given dimension
CalcPpk(dim)	Returns the current part's calculated ppk for the given dimension
CalcR(dim)	Returns the current part's calculated range for the given dimension
CalcRBar(dim)	Returns the current part's calculated r bar for the given dimension
CalcSig(dim)	Returns the current part's calculated sigma for the given dimension
Datum	Returns 1 if in incremental datum mode, 0 if not
HiLimit(dim)	Returns the current part bar graph high limit setting for the given dimension
HiWarn(dim)	Returns the current part bar graph high warning setting for the given dimension
IsDD	Returns 1 if current angular display is decimal degrees, 0 if not
IsDMS	Returns 1 if current angular display is degrees-minutes-seconds, 0 if not
IsInch	Returns 1 if current linear display is in inches, 0 if not
IsMM	Returns 1 if current linear display is in millimeters, 0 if not
LCL(dim)	Returns the current part's calculated lcl value for the given dimension
LoLimit(dim)	Returns the current part bar graph low limit setting value for the given dimension
LoWarn(dim)	Returns the current part bar graph low warning setting value for the given dimension
MaxSGrp	Returns the max num of sub groups that can be stored in the current part's database
NextId	Returns the record number that will be assigned to the next record added to the database
Nominal(dim)	Returns the current part bar graph nominal setting value for the given dimension
NumRecs	Returns the number of data records in the current part's spc database
RecDate(index)	Returns the data record date for the record at index number (0..2000, 0 is the newest)
RecTime	Returns the data record time for the record at index number (0..2000, 0 is the newest)
RLCL(dim)	Returns the current part's calculated range lcl value for the given dimension
RUCL(dim)	Returns the current part's calculated range ucl value for the given dimension
SGrpSize	Returns the size of sub groups in the current part
UCL(dim)	Returns the current part's calculated ucl value for the given dimension
XBarLCL(dim)	Returns the current part's calculated x bar lcl value for the given dimension
XBarUCL(dim)	Returns the current part's calculated x bar ucl value for the given dimension
Loop(lc,ev)	lc is the times to repeat the functions in ev (note that functions can be && together)
MastrMaxG#	Causes a max master calibration to be performed at the current pos, for group # (1..3)

MastrMinG#	Causes a min master calibration to be performed at the current pos, for group # (1..3)
max(v1,v2[,v3]…)	Returns the max value of all arguments
med(v1,v2[,v3]…)	Returns the median value of all arguments
min(v1,v2[,v3]…)	Returns the min value of all arguments
mod(v1,v2)	Returns v1 modulus v2
OnEventXXX(v1)	Wait for an event XXX and then evaluate and return v1, else return the last evaluated v1
DataEntr	Occurs after a data record is entered into the database
DispOff	Occurs after the display is turned off using the "Red" front panel button
DispOn	Occurs after the display is turned on using the "Red" front panel button
Edge1	Occurs after an external edge event has happened on external edge line 1
Edge2	Occurs after an external edge event has happened on external edge line 2
Edge3	Occurs after an external edge event has happened on external edge line 3
HxLx	Occurs after the HwLx function has "latched" a new value
Key	Occurs after the chosen front panel key press has been pressed
PartClr	Occurs after the spc database is cleared (emptied) by the user
PartLoad	Occurs after a new part has been switched to
PartUnld	Occurs before a new part is switched to
Playback	Occurs after a Scan has completed, 1 per captured data record
Power	On Occurs at startup
Trig	Occurs when a Trigger has been activated (i.e. Set)
Part#	Sets the current part number to #
pi	3.14159265358979323846264433832795
Preset(dim,v)	Presets the given dimension to the given value (at the current position)
Relay(v1,v2[,timed])	Set external relay v1 (1..2) to v2 (0/1) and return v2, revert after timed secs
Remark	Adds a comment to the formula, otherwise has no effect
Report#Rec	"Reports" # most recent records
ReportAll	"Reports" all records
ReportNew	"Reports" all records that haven't been "Reported" before
ReportSel	"Reports" the selected record
RsetDyn	Resets (i.e. restarts) the avg, dmn, dmx, HwDmn, HwDmx, HwLx, med, Scan functions
Scan(ch,st,sp,dp,to)	Collects all channel data as fast as possible, using (ch) as the master channel (channel, start value, increment, depth, timeout)
Send[(v,res)]	"Sends" out the supplied value (v) at the given display resolution (res), or the cur dim
Send#Rec	"Sends" # most recent records
SendAllRec	"Sends" all records
SendMsg"ABC"	Outputs the character string ABC out the rs232 port
SendNewRec	"Sends" all records that haven't been "Sent" before
SendSelRec	"Sends" the selected record

seq(-1)	Sets the current sequence number to 1 without saving any records
seq([v1])	Returns the current sequence number (0 if there is no other sequence steps), or optionally enters a new data record when the sequence number = v1
seq(v1,v2)	Returns v2 if the current sequence number is equal to v1, else if the sequence number is less than v1, it returns the value of v2 for the last time the sequence number was equal to v1, else if the sequence number is greater than v1 a "blank" result is returned
SetTrig#	Fires trigger event # (0..9)
SetupXXX	Setup functions for the specified dimension:
BarMax(dim,v)	Sets and Returns the current part bar graph max value (v)
BarMin(dim,v)	Sets and Returns the current part bar graph min value (v)
HiLimit(dim,v)	Sets and Returns the current part bar high limit value (v)
HiWarn(dim,v)	Sets and Returns the current part bar high warning value (v)
LoLimit(dim,v)	Sets and Returns the current part bar low limit value (v)
LoWarn(dim,v)	Sets and Returns the current part bar low warning value (v)
Nominal(dim,v)	Sets and Returns the current part bar nominal value (v)
sin(v1)	Returns the sine of v1
sqrt(v1)	Returns the square root or v1
tan(v1)	Returns the tangent of v1
Time([v1][,v2])	Returns the number of seconds that have elapsed since startup, or optionally the number of seconds that have elapsed greater than or equal to v1 seconds, or optionally the amount that v2 changed over v1 seconds.
TimeStr	Returns the current system time
Trip(,,,)	Enter a new data record
Trip(v1,v2,v3,[v4])	Enter a new data record when v1 passes through v2 then back through v2 and through v3, or optionally wait v4 seconds before entering the record
Var#([v1])	Return the value of variable # (1..20), or optionally assign v1 to the variable
Xlatch(C#,v2,v3)	External Edge Latch. C# = Channel (1..16), v2 = Edge Line # (1..3), v3 = 0/1

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